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KANSAS STATE AGRICULTURAL COLLEGE BULLETIN

VOLUME IV

MARCH 1, 1920

NUMBER 3

CATALOGUE

FIFTY-SEVENTH SESSION, 1919-'20



With Announcements for 1920-'21

MANHATTAN, KANSAS

Published by the College

PRINTED BY
KANSAS STATE PRINTING PLANT
IMRI ZUMWALT, STATE PRINTER
TOPEKA. 1920
8-2702

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The Kansas State Agricultural College Bulletin is published on the first and fifteenth of each month by the Kansas State Agricultural College, Manhattan, Kan., to which requests for copies of the publication should be addressed. Entered as second-class matter November 6, 1916, at the post office at Manhattan, Kan., under the Act of August 24, 1912.

The State Board of Administration

GOVERNOR HENRY J. ALLEN, *ex-officio* Chairman

WILBUR N. MASON HARVEY J. PENNEY E. L. BARRIER

MALCOLM M. GRAY, *Secretary*

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C. W. MYERS, *Assistant Business Manager*

E. B. CRONMEYER, *Assistant Business Manager*

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| | |
|---|--------------------|
| President of the College..... | WILLIAM M. JARDINE |
| Vice President, and Dean of the Division of General Science | J. T. WILLARD |
| Dean of the Division of Agriculture and Di- rector of the Agricultural Experiment Station | F. D. FARRELL |
| Dean of the Division of Veterinary Medicine.. | R. R. DYKSTRA |
| Dean of the Division of Engineering and Di- rector of the Engineering Experiment Station | A. A. POTTER |
| Dean of the Division of Home Economics..... | HELEN B. THOMPSON |
| Dean of the Division of College Extension.... | H. J. UMBERGER |
| Dean of the Summer School..... | E. L. HOLTON |
| Dean of Women..... | MARY P. VAN ZILE |
| Principal of the School of Agriculture..... | H. L. KENT |
| Registrar | JESSIE MCD. MACHIR |
| Librarian | ARTHUR B. SMITH |
| Custodian of Buildings and Grounds..... | G. R. PAULING |

CALENDAR

| 1920 | | | | | | | | | | | | | | 1921 | | | | | | | | | | | | | |
|----------|----|----|----|----|----|----|-----------|----|----|----|----|----|----|----------|----|----|----|----|----|----|-----------|----|----|----|----|----|----|
| JANUARY | | | | | | | JULY | | | | | | | JANUARY | | | | | | | JULY | | | | | | |
| S | M | T | W | T | F | S | S | M | T | W | T | F | S | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
| .. | .. | .. | .. | 1 | 2 | 3 | .. | .. | .. | .. | .. | 1 | 2 | 3 | .. | .. | .. | .. | 1 | 2 | .. | .. | .. | .. | 1 | 2 | |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 30 | 31 | .. | .. | .. | .. | .. | 31 | .. | .. | .. | .. | .. | .. |
| FEBRUARY | | | | | | | AUGUST | | | | | | | FEBRUARY | | | | | | | AUGUST | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | .. | 1 | 2 | 3 | 4 | 5 | 6 | .. | 1 | 2 | 3 | 4 | 5 | 6 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 29 | .. | .. | .. | .. | .. | .. | 29 | 30 | 31 | .. | .. | .. | .. | 27 | 28 | .. | .. | .. | .. | .. | 28 | 29 | 30 | 31 | .. | .. | .. |
| MARCH | | | | | | | SEPTEMBER | | | | | | | MARCH | | | | | | | SEPTEMBER | | | | | | |
| .. | 1 | 2 | 3 | 4 | 5 | 6 | .. | .. | 1 | 2 | 3 | 4 | 5 | .. | 1 | 2 | 3 | 4 | 5 | 6 | .. | .. | 1 | 2 | 3 | 4 | 5 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 28 | 29 | 30 | 31 | .. | .. | .. | 26 | 27 | 28 | 29 | 30 | .. | .. | 27 | 28 | 29 | 30 | 31 | .. | .. | 25 | 26 | 27 | 28 | 29 | 30 | .. |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| APRIL | | | | | | | OCTOBER | | | | | | | APRIL | | | | | | | OCTOBER | | | | | | |
| .. | .. | .. | .. | 1 | 2 | 3 | .. | .. | .. | 1 | 2 | 3 | 4 | .. | .. | .. | 1 | 2 | 3 | 4 | .. | .. | .. | 1 | 2 | 3 | 4 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 25 | 26 | 27 | 28 | 29 | 30 | .. | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| .. | .. | .. | .. | .. | .. | .. | 31 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 30 | 31 | .. | .. | .. | .. | .. |
| MAY | | | | | | | NOVEMBER | | | | | | | MAY | | | | | | | NOVEMBER | | | | | | |
| .. | .. | .. | .. | .. | 1 | .. | .. | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | .. | 1 | 2 | 3 | 4 | 5 | .. |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 | 28 | 29 | 30 | .. | .. | .. | .. | 29 | 30 | 31 | .. | .. | .. | .. | 27 | 28 | 29 | 30 | .. | .. | .. |
| 30 | 31 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| JUNE | | | | | | | DECEMBER | | | | | | | JUNE | | | | | | | DECEMBER | | | | | | |
| .. | 1 | 2 | 3 | 4 | 5 | .. | .. | 1 | 2 | 3 | 4 | 5 | 6 | .. | 1 | 2 | 3 | 4 | 5 | 6 | .. | 1 | 2 | 3 | 4 | 5 | 6 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 27 | 28 | 29 | 30 | .. | .. | .. | 26 | 27 | 28 | 29 | 30 | 31 | .. | 26 | 27 | 28 | 29 | 30 | 31 | .. | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |

The College Calendar

SUMMER SCHOOL, 1920

- May 28, Friday.—Registration of students for Summer School begins at 8 a. m.
May 29, Saturday.—*All classes meet according to schedule.
May 29 to July 30, Saturday to Friday.—Summer School in session, nine weeks.

FIRST SEMESTER, 1920-1921

- Sept. 6, Monday.—†Special courses for auto-mechanics, tractor operators, machinists, blacksmiths, foundrymen, and carpenters begin.
Sept. 10, Friday.—All members of the instructional force on duty.
Sept. 11, Saturday.—Meeting of assigners with committee on schedule at 2 p. m.
Sept. 11, Saturday.—Meeting of assigners with deans at 3 p. m.
Sept. 13, Monday.—Admission and registration of students begin at 8 p. m.
Sept. 14, Tuesday.—Housekeepers' Course begins; registration at 8 a. m.
Sept. 15, Wednesday.—Registration of students closes at 11 a. m.
Sept. 15, Wednesday.—Opening convocation, 11 a. m. to 12 m.
Sept. 15, Wednesday.—*All classes meet according to schedule, beginning at 1 p. m.
Oct. 9, Saturday.—Examinations to remove conditions.
Oct. 16, Saturday.—Scholarship deficiency reports due.
Nov. 13, Saturday.—Midsemester scholarship deficiency reports due.
Nov. 24, Wednesday.—Thanksgiving vacation begins at 12 m.
Nov. 27, Saturday.—Thanksgiving vacation closes at 6 p. m.
Dec. 21, Tuesday.—Housekeepers' Course closes at 12 m.
Dec. 21, Tuesday.—Winter vacation begins at 6 p. m.
Jan. 3, 1921, Monday.—†Special courses for auto-mechanics, electricians, tractor operators, machinists, blacksmiths, foundrymen, carpenters, and radio operators begin.
Jan. 4, Tuesday.—Winter vacation closes at 6 p. m.
Jan. 10, Monday.—Short Course in Agriculture and Creamery Short Course begin.
Jan. 22 to 29, Saturday to Saturday.—Examinations at close of semester.
Jan. 29, Saturday.—First semester closes at 11 a. m.

SECOND SEMESTER, 1920-1921

- Feb. 1, Tuesday.—Admission and registration of students begin at 8 a. m.
Feb. 1, Tuesday.—Housekeepers' Course begins; registration at 8 a. m.
Feb. 2, Wednesday.—Registration of students closes at 11 a. m.
Feb. 2, Wednesday.—*All classes meet according to schedule, beginning at 1 p. m.
Feb. 7 to 12, Monday to Saturday.—Farm and Home Week.
Feb. 22, Tuesday.—Holiday, Washington's Birthday.
Feb. 26, Saturday.—Examinations to remove conditions.
Mar. 5, Saturday.—Scholarship deficiency reports due.
Mar. 5, Saturday.—Short Course in Agriculture and Creamery Short Course close at 12 m.
April 9, Saturday.—Midsemester scholarship deficiency reports due.
April 21, Thursday.—Announcement of elections of seniors to Phi Kappa Phi.
May 10, Tuesday.—Housekeepers' Course closes at 12 m.
May 20 to 26, Friday to Thursday.—Examinations for seniors.
May 26 to June 1, Thursday to Wednesday.—Examinations at close of semester.
May 30, Monday.—Holiday, Decoration Day.
June 2, Thursday.—Commencement Day.

SUMMER SCHOOL, 1921

- June 3, Friday.—Registration of students for Summer School begins at 8 a. m.
June 4 to Aug. 5, Saturday to Friday.—Summer School in session, nine weeks.

FIRST SEMESTER, 1921-1922

- Sept. 12, Monday.—Admission and registration of students begins at 8 a. m.
Sept. 14, Wednesday.—Registration of students closes at 11 a. m.

* Students must be present at the first meeting of each class or render a reasonable excuse. Failure to take out an assignment is not accepted as an excuse for absence from classes. A fee of one dollar is charged those who enroll after the time set for close of registration unless a reasonable excuse is offered.

† Similar courses begin the first Monday of every month from September to May, also, at the beginning of the Summer School.

Standing Committees of the Faculty

ADMISSION: Jessie McD. Machir, J. V. Cortelyou, B. L. Remick, Ina Holroyd, Bessie W. Birdsall, J. O. Hamilton, W. H. Andrews, G. A. Dean, W. B. Wendt, H. L. Ibsen.

ADVANCED CREDIT: *College*.—R. R. Price, L. E. Call, H. H. King, J. R. Macarthur, Elizabeth Rothermel, J. T. Willard.

School of Agriculture.—A. P. Davidson, E. V. James, W. T. Stratton, Wilma Orem.

ASSIGNMENT: Jessie McD. Machir, L. A. Fitz, W. H. Andrews, A. E. White, Araminta Holman, R. A. Seaton.

ATHLETICS: President Jardine, M. F. Ahearn, Z. G. Clevenger, G. A. Dean, H. H. King, E. L. Holton, R. A. Seaton.

CATALOGUE: J. V. Cortelyou, J. T. Willard, H. W. Davis.

COLLEGE RULES: R. R. Price, J. T. Willard, J. E. Kammeyer.

DEBATE: J. R. Macarthur, O. H. Burns, J. G. Emerson.

DISCIPLINE: Albert Dickens, L. A. Fitz, L. E. Conrad, J. W. Searson, Mary P. Van Zile.

GRADUATE STUDY: W. A. Lippincott, L. E. Conrad, L. E. Call, Helen B. Thompson, H. H. King, R. K. Nabours, J. H. Burt.

PUBLIC EXERCISES: J. E. Kammeyer, J. V. Cortelyou, A. E. Westbrook, J. W. Searson, E. L. Holton, W. H. Andrews, W. A. Lippincott.

SCHEDULE OF CLASSES: A. E. White, J. T. Willard, W. T. Stratton, R. I. Throckmorton, L. E. Conrad, Hildegard Kneeland.

STUDENT AFFAIRS: J. R. Macarthur, Mary P. Van Zile, H. H. King, A. E. Westbrook, C. F. Baker, H. L. Kent, Elizabeth Rothermel, J. G. Emerson.

STUDENT HEALTH: L. E. Conrad, L. D. Bushnell, Z. G. Clevenger, Mary P. Van Zile.

Officers of Instruction and Administration

PRESIDENT

WILLIAM MARION JARDINE, B. S. A., LL. D.,

President of the College (1910, 1918).*

B. S. A., Utah Agricultural College, 1904; LL. D., Campbell College, 1916.

† A 30; 1020 Houston.

PROFESSORS

JOHN DANIEL WALTERS, M. S., A. D.,

Professor of Architecture, Emeritus (1876, 1917).

‡ M. S., 1883; A. D., 1908.

E 56; 809 N. Eleventh.

JULIUS TERRASS WILLARD, M. S., Sc. D.,

Vice President of the College (March 1, 1918); Dean of the Division of General Science (1909); Professor of Chemistry (1883, 1901); Consulting Chemist (1888, 1918), Agricultural Experiment Station.

B. S., 1883; M. S., 1886; Sc. D., 1907.

A 47; 1725 Poyntz.

BENJAMIN LUCE REMICK, Ph. M.,

Professor of Mathematics (1900).

Ph. B., Cornell College, 1889; Ph. M., *ibid.*, 1892.

A 71; 613 Houston.

ALBERT DICKENS, M. S.,

Professor of Horticulture (1899, 1902); Horticulturist (1899, 1902), Agricultural Experiment Station.

B. S., 1893; M. S., 1901.

H 30; 509 N. Manhattan.

RALPH RAY PRICE, A. M.,

Professor of History and Civics (1903).

A. B., Baker University, 1896; A. M., University of Kansas, 1898.

F 57; 826 Houston.

JULIUS ERNEST KAMMEYER, A. M., LL. D.,

Professor of Economics (1903, 1904).

A. B., Central Wesleyan College, 1886; A. M., *ibid.*, 1889; LL. D., Kansas City University, 1912.

A 52; 340 N. Sixteenth.

JOHN VANZANDT CORTELYOU, Ph. D.,

Professor of Modern Languages (1904, 1916).

A. B., University of Nebraska, 1897; A. M., *ibid.*, 1901; Ph. D., University of Heidelberg, 1904.

N 59; 325 N. Fourteenth.

* One date standing immediately after the title shows when the office was assumed. In the case of two dates separated by a comma or a semicolon, the first date indicates when services with the College began, the second when present office was assumed. Dates separated by a dash indicate times of assumption and termination, respectively, of the duties indicated in the title.

† The College buildings are designated by letters, as follows:

A—Anderson Hall (Administration).

Ag—Waters Hall (Agriculture).

C—Denison Hall (Chemistry, Physics).

CA—Chemistry Annex.

D—Dairy Hall.

E—Engineering Hall.

F—Fairchild Hall (Library).

G—School of Agriculture Hall.

H—Horticultural Hall.

I—Illustrations Hall.

K—Kedzie Hall (Cafeteria).

L—Home Economics Hall.

M—Auditorium.

N—Nichols Gymnasium.

R—Farm Machinery Hall.

S—Engineering Shops.

V—Veterinary Hall.

X—Dairy Commission Hall.

‡ In a statement of degrees without mention of the institution conferring them, the Kansas State Agricultural College is to be understood.

JOHN ORR HAMILTON, B. S.,

Professor of Physics (1901, 1908).

B. S., University of Chicago, 1900.

C 57; 331 N. Fourteenth.

MARY PIERCE VAN ZILE,

Dean of Women (1908, 1918).

Diploma, Iowa State College, 1904.

A 40; 1318 Fremont.

LOWELL EDWIN CONRAD, M. S.,

Professor of Civil Engineering (1908, 1909).

B. S., Cornell College, 1904; C. E., *ibid.*, 1906; M. S., Lehigh University, 1908.

E 32; 317 N. Seventeenth.

LESLIE ARTHUR FITZ, B. S.,

Professor of Milling Industry (1910, 1912).

B. S., 1902.

Ag 40; 1014 Houston.

EDWIN LEE HOLTON, A. B.,

Professor of Education (1910, 1913); Dean of the Summer School (1910, 1918).

A. B., Indiana University, 1904.

A 32; 217 N. Fourteenth.

ANDREY ABRAHAM POTTER, S. B.,

Dean of the Division of Engineering (1905, 1914); Director of the Engineering Experiment Station (1913, 1914); Professor of Steam and Gas Engineering (1905, 1910).

S. B., Massachusetts Institute of Technology, 1903.

E 30; 1328 Fremont.

ROY ANDREW SEATON, M. S.,

Professor of Applied Mechanics and Machine Design (1904, 1914).

B. S., 1904; M. S., 1910; S. B., Massachusetts Institute of Technology, 1911.

S 61; 722 Humboldt.

JAMES WILLIAM SEARSON, A. M.,

Professor of English (1910, 1911).

A. B., University of Nebraska, 1896; A. M., *ibid.*, 1899.

K 27; 1314 Fremont.

ARTHUR BOURNE SMITH, Ph. B., B. L. S.,

College Librarian (1911).

Ph. B., Wesleyan University, 1900; B. L. S., University of Illinois, 1902.

F 32; 810 S. Juliette.

WILLIAM ADAMS LIPPINCOTT, M. S.,

Professor of Poultry Husbandry (1912); Poultry Husbandman (1912), Agricultural Experiment Station.

A. B., Illinois College, 1903; B. S., Iowa State College, 1911; M. S., University of Wisconsin, 1917.

Ag 38; 321 N. Eighteenth.

LELAND DAVID BUSHNELL, M. S.,

Professor of Bacteriology (1909, 1912); Bacteriologist (1909, 1912), Agricultural Experiment Station.

B. S., Michigan Agricultural College, 1905; M. S., University of Kansas, 1915.

V 54; 1414 Humboldt.

BESSIE WEBB BIRDSALL,

Professor of Clothing and Textiles (1912).

Graduate, Drexel Institute, 1903.

L 56; 1320 Fremont.

LELAND EVERETT CALL, M. S.,

Professor of Agronomy (1907, 1913); Agronomist (1907, 1913), Agricultural Experiment Station.

B. S. in Agr., Ohio State University, 1906; M. S., *ibid.*, 1912.

Ag 58; 223 N. Fourteenth.

GEORGE ADAM DEAN, M. S.,

Professor of Entomology (1902, 1913); Entomologist (1902, 1913),
Agricultural Experiment Station.

B. S., 1895; M. S., 1905.

F 52; 327 N. Seventeenth.

ROBERT KIRKLAND NABOURS,³ Ph. D.,

Professor of Zoölogy (1910, 1913); Zoölogist (1910, 1913), Agricultural
Experiment Station; Curator of the Natural History Museum
(1910).

Ed. B., University of Chicago, 1905; Ph. D., *ibid.*, 1911.

F 54; 210 S. Tenth.

RALPH RALPH DYKSTRA, D. V. M.,

Dean of the Division of Veterinary Medicine (1911; July 1, 1919);
Professor of Surgery (1911, 1913).

D. V. M., Iowa State College, 1905.

V 31; 607 Houston.

CLARENCE ERLE REID, B. S.,

Professor of Electrical Engineering (1914).

B. S. in E. E., Purdue University, 1902.

C 33; 421 N. Sixteenth.

FRANCES LANGDON BROWN,² A. B., B. S.,

State Leader of Emergency Home Demonstration Agents (1909, 1917),
Division of College Extension.

B. S., 1909; A. B., Kansas State Normal School, 1910.

A 35; 510 N. Ninth.

MICHAEL FRANCIS AHEARN, M. S.,

Professor of Landscape Gardening (1904, 1915).

B. S., Massachusetts Agricultural College, 1904; M. S., 1913.

H 27; 110 N. Juliette.

NELSON ANTRIM CRAWFORD, A. M.,

Professor of Industrial Journalism and Superintendent of Printing
(1910, 1915).

A. B., State University of Iowa, 1910; A. M., University of Kansas, 1914.

K 52; 221 N. Juliette.

ARTHUR EDGAR WESTBROOK, A. B., B. Mus.,

Director of Music and Professor of Voice (1915).

A. B., Albion College, 1910; B. Mus., *ibid.*, 1911.

M 30; 309 N. Sixteenth.

JOHN ROBERTSON MACARTHUR, Ph. D.,

Professor of English (1914, 1916).

A. B., University of Manitoba, 1892; Ph. D., University of Chicago, 1903.

A 59A; 1126 Bluemont.

ZORA GOODWIN CLEVENGER,

Professor of Physical Education and Director of Athletics (1916).

Student, Indiana University, 1900-1904; Graduate, Summer School of Physical Education and Athletics, Chautauqua, N. Y., 1905; Graduate, Summer School for Coaches and Directors, University of Illinois, 1915.

N 35; ———.

CHARLES MOSES SIEVER, Ph. G., M. D.,

College Physician (1916).

Ph. G., Trinity University, 1903; M. D., *ibid.*, 1903; M. D., University of Kansas, 1907.

A 65; 1627 Anderson.

ANDREW CLEVELAND HARTENBOWER,¹ B. S.,

Superintendent of Institutes and Extension Schools, Division of College Extension (July 1, 1917 - November 15, 1919).

B. S., Oklahoma College of Agriculture and Mechanic Arts, 1905.

1. Resigned.

2. In coöperation with the U. S. Department of Agriculture.

3. Absent on leave, Nov. 1, 1919, to Aug. 31, 1920.

WALTER WILLIAM CARLSON, B. S., M. E.,

Professor of Shop Practice (1910, 1917); Superintendent of Shops (1910, 1912).

B. S., 1908; M. E., 1916.

S 62; 1130 Bluemont.

SAMUEL CECIL SALMON, B. S.,

Professor of Farm Crops (1913, 1917).

B. S., South Dakota Agricultural and Mechanical College, 1907.

Ag 82; 1648 Leavenworth.

JAMES GORDON EMERSON, J. D.,

Professor of Public Speaking (1915, 1917).

B. S., Iowa State College, 1912; J. D., Leland Stanford, Junior, University School of Law, 1915.

G 56; 1623 Anderson.

CECIL FRANKLIN BAKER, M. S.,

Professor of Architecture (1917).

A. B., University of Illinois, 1907; B. S., Massachusetts Institute of Technology, 1907; M. S., *ibid.*, 1909.

E 57; 321 N. Eighteenth.

WALTER HORACE BURR,²

Director of Rural Service (1914, 1915), Division of College Extension.

A 3; 612 N. Fourteenth.

HARRY JOHN CHARLES UMBERGER,² B. S.,

Dean, Division of College Extension (1911; July 1, 1919); County Agent Leader, Division of College Extension (1911; 1917 - Dec. 31, 1919).

B. S., 1905.

A 33; 1739 Fairchild.

OTIS EARLE HALL,¹ A. B.,

Director of Junior Extension Service (1914-April 15, 1920), Division of College Extension.

A. B. Wabash College, 1907.

MARY WHITING McFARLANE, M. S.,

State Leader of Home Economics Specialists (1918), Division of College Extension.

B. S., University of Wyoming, 1894; M. S., Oregon Agricultural College, 1916.

A 36; 1335 Anderson.

HERBERT HIRAM KING, Ph. D.,

Professor of Chemistry (1906, 1918); Chemist, Agricultural Experiment Station (1918); Chemist, Engineering Experiment Station (1909, 1918).

B. S., Ewing College, 1904; A. M., *ibid.*, 1906; M. S., 1915; Ph. D., University of Chicago, 1918.

C 30; 916 Humboldt.

CHARLES WILBUR McCAMPBELL, D. V. M.,

Professor of Animal Husbandry (1910, 1918); Animal Husbandman (1910, 1918), Agricultural Experiment Station.

B. S., 1906; D. V. M., 1910; B. S. in Agr., 1918.

Ag. 8; 343 N. Fourteenth.

RAY IAMS THROCKMORTON, B. S.,

Professor of Soils (1911, 1918).

B. S., Pennsylvania State College, 1911.

Ag 60; 825 Houston.

2. In coöperation with the U. S. Department of Agriculture.

JAMES EDWARD ACKERT, Ph. D.,

Professor of Zoölogy (1913, 1918), in Charge (Nov. 1, 1919 - Aug. 31, 1920); Parasitologist (1913), Agricultural Experiment Station.

A. B., University of Illinois, 1909; A. M., *ibid.*, 1911; Ph. D., *ibid.*, 1913.

F 58; 1605 Humboldt.

ALFRED EVERETT WHITE, M. S.,

Professor of Mathematics (1909, 1918).

B. S., Purdue University, 1904; M. S., *ibid.*, 1909.

A 72; 1743 Fairchild.

JAMES BURGESS FITCH, B. S.,

Professor of Dairy Husbandry (1910, 1918); Dairy Husbandman (1910, 1918), Agricultural Experiment Station.

B. S., Purdue University, 1910.

D 30; 321 N. Sixteenth.

HALLAM WALKER DAVIS, A. M.,

Professor of English (1913, 1918).

A. B., Indiana University, 1909; A. M., Columbia University, 1913.

A 61; 532 N. Fourteenth.

ARAMINTA HOLMAN,

Professor of Applied Art (1913, 1918).

Graduate, New York School of Fine and Applied Art, 1912.

A 67; 1636 Fairchild.

FRANCIS DAVID FARRELL, B. S.,

Dean, Division of Agriculture (1918); Director (1918), Agricultural Experiment Station.

B. S., Utah Agricultural College, 1907.

Ag 34; 1007 Houston.

HELEN BISHOP THOMPSON, Ph. D.,

Dean, Division of Home Economics (1918); Professor of Nutrition and Dietetics (1918).

B. S., 1903; M. S., 1907; A. M., Columbia University, 1913; Ph. D., Yale University, 1917.

L 30; 1412 Leavenworth.

VIVAN LEWIS STRICKLAND, A. M.,

Professor of Education (Jan., 1920); Director of Home-study Service (1917, 1918), Division of College Extension.

A. B., University of Nebraska, 1906; A. M., *ibid.*, 1915.

A 4; 1512 Leavenworth.

JAMES PARK CALDERWOOD, M. E., M. S.,

Professor of Mechanical Engineering (1918, 1919).

M. E., Ohio State University, 1908; M. S., Pennsylvania State College, 1916.

S 55; 321 N. Fourteenth.

HARRY LLEWELLYN KENT, B. S.,

Professor of Vocational Education (1911; July 1, 1919); Principal of School of Agriculture (1911, 1913).

A. B., Kansas State Normal School, 1912; B. S., 1913.

G 29, 32; 321 Delaware.

JAMES HENRY BURT, D. V. M.,

Professor of Anatomy and Physiology (1909; July 1, 1919).

V. S., Ontario Veterinary College, 1895; D. V. M., Ohio State University, 1905.

V 32; 800 Poyntz.

LEO EDWARD MELCHERS, M. S.,

Professor of Botany and Plant Pathology (1914; July 1, 1919); Plant Pathologist (1914), Agricultural Experiment Station.

B. S., Ohio State University, 1912; M. S., *ibid.*, 1913.

H 58; 1801 Leavenworth.

EDWIN CYRUS MILLER, Ph. D.,

Professor of Plant Physiology (1910; July 1, 1919).

A. B., Lebanon College, 1906; A. B., Yale University, 1907; Ph. D., *ibid.*, 1910.
H 56; 591 Laramie.

LOTTA JEAN BOGERT, Ph. D.,

Professor of Food Economics and Nutrition (Sept. 1, 1919).

A. B., Cornell University, 1910; Ph. D., Yale University, 1916.

L 42; 903 Houston.

HILDEGARDE KNEELAND, A. B.,

Professor of Household Economics (Sept. 1, 1919).

A. B., Vassar College, 1911.

L 42; 1638 Osage.

FREDERICK BRAHAN TERRELL, Capt. Inf., U. S. A.,

Professor of Military Science and Tactics, and Commandant of Cadets
(Sept. 1, 1919).

N 26; 353 N. Fifteenth.

THOMAS JESSE TALBERT, A. M.,

Superintendent of Institutes and Extension Schools (Dec. 1, 1919),
Division of College Extension.

B. S. in Agr., University of Missouri, 1913; A. M., *ibid.*, 1917.

A 34; 1123 Houston.

ASSOCIATE PROFESSORS

ODIS HERSCHEL BURNS, A. B.,

Associate Professor of English, and Debate Coach (1918; Sept. 1,
1919).

A. B., University of Kansas, 1916.

G 66; 1623 Anderson.

LEWIS CLARKE DAVIDSON, Capt. Inf., U. S. A.,

Associate Professor of Military Science and Tactics (Feb. 19, 1919;
Sept. 1, 1919).

Graduate, United States Military Academy, 1915.

N 27; 317 S. Delaware.

WILLIAM HIDDLESON ANDREWS, A. B., M. S.,

Associate Professor of Education (1906, 1913).

A. B., University of Chicago, 1900; M. S., 1919.

A 64; 630 Moro.

CHARLES OSCAR SWANSON, M. Agr.,

Associate Professor of Agricultural Chemistry (1906, 1914); Associate
Chemist (1906, 1914), Agricultural Experiment Station.

A. B., Carleton College, 1899; M. Agr., University of Minnesota, 1905.

C 6; 931 Bluemont.

HARRY BRUCE WALKER, B. S. in C. E.,

Associate Professor of Irrigation and Drainage Engineering (1914);
Drainage and Irrigation Engineer (1910), Division of College Ex-
tension.

B. S. in C. E., Iowa State College, 1910.

E 32; 110 S. Seventeenth.

IVOR VICTOR ILES, A. M.,

Associate Professor of History and Civics (1911, 1915).

A. B., University of Kansas, 1905; A. M., *ibid.*, 1905.

F 4; 1725 Fairchild.

OLIVER WILLIAM HUNTER, M. S.,

Associate Professor of Bacteriology (1911, 1917).

B. S., 1909; M. S., University of Wisconsin, 1911.

V 28; 417 Houston.

JONTA BOEN MARCELLUS,¹ B. S. in C. E.,

Associate Professor of Irrigation and Drainage Engineering (1917 - Sept. 30, 1919); Drainage and Irrigation Engineer (1917 - Sept. 30, 1919), Division of College Extension.

B. S. in C. E., University of Kansas, 1904.

PORTER JOSEPH NEWMAN, M. S.,

Associate Professor of Chemistry (1909, 1918).

B. S., Franklin College, 1908; M. S., *ibid.*, 1910. W 27; 914 Leavenworth.

EDWARD GUERRANT KELLY, M. S.,

Associate Professor of Entomology (1918; Jan. 1, 1920), Division of College Extension.

B. S., University of Kentucky, 1903; M. S., *ibid.*, 1904. F 64; 431 Leavenworth.

JOSIAH SIMSON HUGHES, Ph. D.,

Associate Professor of Chemistry (1910, 1918).

B. S., Ohio Wesleyan University, 1908; M. S., *ibid.*, 1910; A. M., Ohio State University, 1910; Ph. D., *ibid.*, 1917. C 41; 344 N. Fifteenth.

GRACE EMILY DERBY, A. B.,

Associate Librarian (1911, 1918).

A. B., Western College for Women, 1905. F 32; 1825 Leavenworth.

JAMES WALKER MCCOLLOCH, B. S.,

Associate Entomologist (1910, 1918), Agricultural Experiment Station.

B. S., 1912. F 64; 1626 Leavenworth.

HOWARD W. BRUBAKER, Ph. D.,

Associate Professor of Chemistry (1913, 1918).

B. S., Carleton College, 1899; Ph. D., University of Pennsylvania, 1904. C 64; 1116 Fremont.

INA FOOTE COWLES, B. S.,

Associate Professor of Clothing and Textiles (1902, 1918).

B. S., 1901. L 55; 1021 Houston.

MARY THERESA HARMAN, Ph. D.,

Associate Professor of Zoölogy (1912, 1918).

A. B., Indiana University, 1907; A. M., *ibid.*, 1909; Ph. D., *ibid.*, 1912. F 62; 1430 Poyntz.

GEORGE ELLSWORTH RABURN, M. S.,

Associate Professor of Physics (1910, 1918).

A. B., University of Michigan, 1907; M. S., *ibid.*, 1913. C 61; 1014 Bluemont.

ROBERT WARREN CONOVER, A. M.,

Associate Professor of English (1915, 1918).

A. B., Wesleyan University, 1911; A. M., *ibid.*, 1914. A 58; 319 N. Sixteenth.

MAURICE COLE TANQUARY,¹ Ph. D.,

Associate Professor of Entomology (1912; 1918 - Feb. 1, 1920); Associate Entomologist (1912; 1918 - Feb. 1, 1920), Agricultural Experiment Station.

A. B., University of Illinois, 1907; A. M., *ibid.*, 1908; Ph. D., *ibid.*, 1912.

1. Resigned.

WYLIE BRODBECK WENDT, B. C. E.,

Associate Professor of Applied Mechanics (1916, 1918).

B. C. E., University of Kentucky, 1906.

E 8A; 1623 Anderson

FRED D. MERRITT, Ph. D.,

Associate Professor of Sociology and Economics (1917, 1918).

B. S., Upper Iowa University, 1891; A. M., University of Iowa, 1898; Ph. D., *ibid.*, 1900.

A 59; 1634 Osage.

FLOYD WAYNE BELL, B. S. A.,

Associate Professor of Animal Husbandry (1918).

B. S. A., Cornell University, 1911.

Ag 5; 916 Osage.

EUSTACE VIVIAN FLOYD,⁴ B. S.,

Associate Professor of Physics (1911, 1918).

B. S., Earlham College, 1903.

EVAN F. FERRIN, B. S.,

Associate Professor of Animal Husbandry (1918).

B. S. in A. H., Iowa State College, 1911.

Ag 13; 1511 Leavenworth.

WALDO ERNEST GRIMES, B. S.,Associate Professor of Agricultural Economics (1913; July 1, 1919);
in Charge (Feb. 1, 1920).

B. S., 1913.

Ag 51A; 1821 Leavenworth.

CLAUDE CARROLL CUNNINGHAM,¹ B. S.,

Associate Professor of Agronomy (1907; July 1, 1919 - Apr. 1, 1920).

B. S., 1903.

Ag. 60; 1026 Fremont.

ANDREW MINIE PATERSON, B. S.,

Associate Professor of Animal Husbandry (1913; July 1, 1919).

B. S., 1913.

Ag 13; 1320 Fremont.

JOHN HUNTINGTON PARKER, M. S.,

Associate Professor of Farm Crops (1917; July 1, 1919).

B. S. in Agr., University of Minnesota, 1913; M. S. in Agr., Cornell University, 1916.

Ag 76; 1809 Leavenworth.

HAROLD MORTON JONES, B. S.,

State Dairy Commissioner (1913; July 1, 1919).

B. S., Purdue University, 1908.

X; 904 Blument.

CHARLES ELKINS ROGERS, A. B.,

Associate Professor of Industrial Journalism (July 1, 1919).

A. B., University of Oklahoma, 1914.

K 55; 905 Laramie.

RUDOLPH LOUIS HENSEL, B. S. F.,

Associate Professor of Pasture Management (July 15, 1919).

B. S. F., Iowa State College, 1913.

Ag 82; 1416 Humboldt.

PERCY LEIGH GAINNEY, A. M., M. S.,

Associate Professor of Bacteriology (1914; July 1, 1919); Soil Bacteriologist (1914), Agricultural Experiment Station.

B. Agr., North Carolina College of Agriculture and Mechanic Arts, 1908; M. S., *ibid.*, 1910; A. M., Washington University, 1911.

V 26; 1019 Houston.

1. Resigned.

4. Absent on leave, 1919-'20.

WILLIAM TIMOTHY STRATTON, A. M.,

Associate Professor of Mathematics (1910; Sept. 1, 1919).

A. B., Indiana University, 1906; A. M., *ibid.*, 1913. A 70; R. F. D. 1.

ELDEN VALORIUS JAMES, A. M.,

Associate Professor of History and Civics (1912; Sept. 1, 1919).

A. B., Marietta College, 1901; A. B., University of Michigan, 1905; A. M., Marietta College, 1908. F 1; 621 Humboldt.

JOHN CHRISTIAN PETERSON, Ph. D.,

Associate Professor of Education (1917; Sept. 1, 1919).

A. B., University of Utah, 1913; Ph. D., University of Chicago, 1917. A 66; 1622 Osage.

ELIZABETH ROTHERMEL, A. M.,

Associate Professor of Food Economics and Nutrition (1918; Sept. 1, 1919).

A. B., University of California, 1899; A. M., Columbia University, 1913. L 35; 1014 Houston.

WILLIAM EDWARD MULDOON, D. V. M., A. M.,

Associate Professor of Surgery and Medicine (Sept. 1, 1919).

D. V. M., New York State Veterinary College, Cornell University, 1913; A. M., Cornell University, 1916. V 33; 1709 Laramie.

ELLEN ANN REYNOLDS,¹ M. S., A. M.,

Associate Professor of Household Economics (Sept. 1, 1919 - Feb. 13, 1920).

B. S., University of Kentucky, 1895; M. S., *ibid.*, 1896; A. M., University of Chicago, 1919.

FREDERICK ERVING COLBURN,

Head of Department of Illustrations (Oct. 7, 1919).

I; 322 N. Seventeenth.

ASSISTANT PROFESSORS

WILMER ESLA DAVIS, A. B.,

Assistant Professor of Botany (1909).

Graduate, Ohio Normal University, 1894; A. B., University of Illinois, 1903. H 76; 1014 Vattier.

EDGAR LEMUEL TAGUE, A. M.,

Assistant Professor of Chemistry (1914); Assistant in Protein Chemistry (1914), Agricultural Experiment Station.

A. B., University of Kansas, 1908; A. M., *ibid.*, 1909. C 3; 617 N. Manhattan.

ADA RICE, M. S.,

Assistant Professor of English (1899, 1915).

B. S., 1895; M. S., 1912. G 28; 917 Osage.

JOSEPH HENRY MERRILL, Ph. D.,

Assistant Professor of Entomology (1912, 1915); Assistant Entomologist (1912), Agricultural Experiment Station.

B. S., Dartmouth College, 1905; Ph. D., Massachusetts Agricultural College, 1914. F 52; 626 Moro.

FORREST FAYE FRAZIER, C. E.,

Assistant Professor of Civil Engineering (1911, 1915).

C. E., Ohio State University, 1910. E 55; 1815 Leavenworth.

1. Resigned.

MALCOLM CAMERON SEWELL, M. S.,
Assistant Professor of Soils (1914, 1915).

B. S., 1912; M. S., Ohio State University, 1914. Ag 56; 530 N. Fourteenth.

ALBERT GARLAND HOGAN,¹ Ph. D.,

Assistant Professor of Chemistry (1914; 1916 - Oct. 15, 1919), Agricultural Experiment Station.

A. B., University of Missouri, 1907; B. S., *ibid.*, 1909; A. M., *ibid.*, 1912; Ph. D., Yale University, 1914.

ROYCE GERALD KLOEFFLER, B. S.,

Assistant Professor of Electrical Engineering (1916).

B. S. in E. E., University of Michigan, 1913. C 33; 831 Vattier.

ADOLPH GEORGE SCHULZ,¹

Assistant Professor of Athletics and Assistant Coach (1916-May 31, 1920).

Student, University of Michigan, 1904-'08.

CLINTON ELLICOTT PEARCE, S. B.,

Assistant Professor of Machine Design (1917).

S. B., Massachusetts Institute of Technology, 1919. S 63; 615 N. Eleventh.

GEORGE MERRITT POTTER,¹ D. V. M.,

Specialist in Veterinary Medicine (1917 - Dec. 31, 1919), Division of College Extension.

D. V. M., Ohio State University, 1906.

ROSS MADISON SHERWOOD,¹ B. S.,

Specialist in Poultry Husbandry (1914 - Sept. 30, 1919), Division of College Extension.

B. S. in A. H., Iowa State College, 1910.

LEILA DUNTON, M. S.,

Assistant Professor of English (1916; 1917 - Oct. 16, 1919).

B. S., 1910; M. S., 1912. Ag 40; 325 N. Seventeenth.

ELIZABETH MACLEAN,⁶ Ph. D., M. Di.,

Assistant Professor of English (1916; 1917 - Oct. 16, 1919).

B. Di., Iowa State Teachers' College, 1894; M. Di., *ibid.*, 1900; Ph. B., University of Chicago, 1909.

HENRY HUXLEY FENTON, B. S.,

Assistant Professor of Electrical Engineering (1917; Sept. 1, 1919).

B. S. in E. E., 1913. C 33; 1449 Laramie.

HARLEY JAMES BOWER,² M. S.,

Assistant Professor of Soils (1913; Jan. 1, 1920), Division of College Extension.

B. S., 1910; M. S., Ohio State University, 1912. Ag 60; 419 Leavenworth.

EARL ARTHUR STEWART, B. S.,

Assistant Professor of Physics (1918).

B. S., University of Chicago, 1915; B. Pd., Michigan State Normal College, 1910. C 36; College Hill.

1. Resigned.

2. In coöperation with the U. S. Department of Agriculture.

6. Deceased.

WALTER LEROY LATSHAW, B. S.,

Assistant Professor of Chemistry (1914, 1918).

B. S., Pennsylvania State College, 1912.

C 3; 917 Fremont.

NORMAN EVERETT OLSON, B. S.,

Assistant Professor of Dairy Husbandry (1918).

B. S., Iowa State College, 1915.

D 30; 1601 Humboldt.

WILLIAM HENRY SANDERS, M. E.,

Assistant Professor of Farm Engineering (1914, 1918), in Charge (July 1, 1919).

B. S., 1890; M. E., 1916.

R; N. Manhattan.

JAMES WALTER ZAHNLEY, B. S.,

Assistant Professor of Farm Crops (1915; Nov. 15, 1919); Assistant Professor of Education (1915; 1918 - Nov. 15, 1919).

B. S., 1909; B. S. in Agr., 1918.

Ag 82; 1131 Laramie.

HARRY WINFIELD CAVE, M. S.,

Assistant Professor of Dairy Husbandry (1918).

B. S. A., Iowa State College, 1914; M. S., 1916.

D 30; 1638 Osage.

ALICE LLOYD-JONES,¹ M. S.,

Assistant Professor of Education (1918, 1919).

B. S., University of Wisconsin, 1911; M. S., *ibid.*, 1918.

L 64; 331 N. Seventeenth.

CLYDE WILLIAM MULLEN,¹ M. S.,

Assistant Professor of Farm Crops (1918 - Nov. 1, 1919).

B. S., Oklahoma College of Agriculture and Mechanic Arts, 1915; M. S., 1917.

CARL G. ELLING,² B. S.,

Assistant Professor of Animal Husbandry (1918; Jan. 1, 1920), Division of College Extension.

B. S., 1904.

A 33; R. R. 1.

PAUL PORTER BRAINARD, A. M.,

Assistant Professor of Education (1919; Jan., 1920), Home Study Service, Division of College Extension.

B. L., Whitman College, 1909; A. M., Columbia University, 1913.

A 5; 1114 Vattier.

HARRY BURDETT WINCHESTER, M. S.,

Assistant Professor of Animal Husbandry (1919).

B. S., Iowa State College, 1916; M. S., *ibid.*, 1917.

Ag 13; 1221 Laramie.

PRESTON ESSEX McNALL,¹ M. S.,

Specialist in Farm Management Studies (1913; 1919 - Sept. 30, 1919), Division of College Extension.

B. S. in E. E., 1909; B. S. in Agr., 1913; M. S., 1914.

ALONZO FRANKLIN TURNER,² B. S.,

Assistant State Leader of County Agents (1917; Jan. 1, 1920), Division of College Extension.

B. S., 1905.

A 2; 810 Moro.

1. Resigned.

2. In cooperation with the U. S. Department of Agriculture.

KARL KNAUS,² B. S.,

Assistant County Agent Leader in Charge (1916; Jan. 1, 1920), Division of College Extension.

B. S., 1914.

A 2; 519 N. Manhattan.

CHARLES HENRY SCHOLER, B. S.,

Testing Engineer (1919), Department of Applied Mechanics and Machine Design, Engineering Experiment Station.

B. S., 1914.

E 8A; 1616 Fairview.

EDGAR TALBERT KEITH, B. S.,

Assistant Professor of Printing (1912; July 1, 1919).

B. S., 1912.

K1; 1421 Poyntz.

HERBERT FREDERICK LIENHARDT, D. V. M.,

Assistant Professor of Pathology (1917; July 1, 1919).

D. V. M., University of Pennsylvania, 1916.

V 58; 1015 Fremont.

FRANK ELMER FOX, B. S.,

Assistant Professor of Poultry Husbandry (1916; July 1, 1919).

B. S., Iowa State College, 1915.

Ag 38; 1604 Humboldt.

FREDERICK LEE HISAW, A. M.,

Assistant Professor of Zoölogy (July 1, 1919); Mammalogist (July 1, 1919), Agricultural Experiment Station.

A. B., University of Missouri, 1914; B. S., *ibid.*, 1915; A. M., *ibid.*, 1916.

F 54A; 1622 Osage.

HEMAN LAURITZ IBSEN, Ph. D.,

Assistant Professor of Genetics (July 1, 1919).

B. S., University of Wisconsin, 1912; M. S., *ibid.*, 1913; Ph. D., *ibid.*, 1916.

Ag 15A; 1623 Anderson.

FREDERICK LUNDY THOMSEN, M. S.,

Assistant Professor of Agricultural Economics (July 1, 1919).

B. S., Maryland State College of Agriculture, 1917; M. S., University of Wisconsin, 1919.

Ag 51A; 1725 Anderson.

ARTHUR FREDERICK PEINE, A. M.,

Assistant Professor of History and Civics (1913; Sept. 1, 1919).

A. B., Illinois Wesleyan University, 1911; A. M., University of Illinois, 1913.

F 4; 826 Houston.

ARTHUR ROY FEHN, Ph. B.,

Assistant Professor of Mathematics (1910; Sept. 1, 1919).

Ph. B., Baldwin Wallace College, 1903.

A 70; 1506 Poyntz.

LOUIS HENRY LIMPER, A. M.,

Assistant Professor of Modern Languages (1914; Sept. 1, 1919).

A. B., Baldwin Wallace College, 1907; A. M., University of Wisconsin, 1914.

STANLEY ALBERT SMITH, B. S.,

Assistant Professor of Architecture (1913; Sept. 1, 1919).

B. S., 1913.

E 58B; 812 Laramie.

FLORENCE MABELLE HEIZER, A. B.,

Assistant Professor of English (1918; Sept. 1, 1919).

A. B., Bethany College, 1907; A. B., University of Kansas, 1910.

A 53; 703 Poyntz.

2. In coöperation with the U. S. Department of Agriculture.

MARTHA S. PITTMAN, A. M.,

Assistant Professor of Food Economics and Nutrition (Sept. 1, 1919).

B. S., 1906; B. S., Columbia University, 1916; M. S., *ibid.*, 1918.

L 47; 112 S. Twelfth.

WILLIAM RAYMOND BRACKETT, A. B.,

Assistant Professor of Physics (Sept. 1, 1919).

A. B., University of Colorado, 1905.

C 38; 530 Moro.

CHARLES WILLIAM COLVER, Ph. D.,

Assistant Professor of Organic Chemistry (Sept. 1, 1919).

B. S., University of Idaho, 1909; M. S., *ibid.*, 1911; Ph. D., University of Illinois, 1919.

C 64; 1610 Laramie.

EDWARD CHAPMAN CONVERSE, A. M.,

Assistant Professor of Physics (Sept. 1, 1919).

A. B., University of Illinois, 1904; A. M., *ibid.*, 1909.

C 38; College Hill.

FRANK CALEB GATES, Ph. D.,

Assistant Professor of Botany (Sept. 1, 1919).

A. B., University of Illinois, 1910; Ph. D., University of Michigan, 1912.

H 57; 1218 Bluemont.

HERBERT ALLEN LORENZ,

Assistant Professor of Physical Education (Sept. 1, 1919).

Graduate, Y. M. C. A. College, Springfield, Mass., 1914.

N 35; 523 Houston.

ELMER LAMONT RHOADES, B. S.,

Assistant Professor of Farm Management (Oct. 1, 1919), Division of College Extension.

B. S., University of Missouri, 1916.

A 2; 523 Pierre.

ALLAN PARK DAVIDSON, B. S.,

Assistant Professor of Education (Nov. 15, 1919); Associate Principal of School of Agriculture (Nov. 15, 1919).

B. S., 1914.

G 29²; 1200 Bertrand.

WILLIAM EARL PETERSON,² M. S.,

Assistant Professor of Dairy Husbandry (1917; Jan. 1, 1920), Division of College Extension.

B. S. in Agr., University of Minnesota, 1916; M. S., *ibid.*, 1917.

D 31; 515 Bluemont.

JULIA MARGARET BAKER ALDER, B. S.,

Assistant Professor of English (1917; Jan. 1, 1920), Home Study Service, Division of College Extension.

B. S., 1914; Graduate, Kansas State Normal School, 1912.

A 5; 327 N. Fifteenth.

ROY WILLIAM KISER,² B. S.,

Assistant Professor of Animal Husbandry (1918; Jan. 1, 1920), Division of College Extension.

B. S., 1914.

A 34; 1635 Fairchild.

GEORGE GEMMELL, B. S.,

Assistant Professor of Agronomy (1918; Jan. 1, 1920), Home Study Service, Division of College Extension.

B. S., Kansas Manual Training Normal School, 1917.

A 5; 411 N. Sixteenth.

RALPH KENNEY, B. S. A.,

Assistant Professor of Crops (1914; Jan. 1, 1920), Division of College Extension.

B. S. A., Ohio State University, 1912.

Ag 59; 714 Houston.

THOMAS ARTHUR CASE, D. V. M.,

Assistant Professor of Veterinary Medicine (1918; Jan. 1, 1920), Division of College Extension.

D. V. M., 1912.

V 27; 1324 Laramie.

HARRY ELKINS DODGE,¹ B. S.,

Assistant Professor of Dairy Husbandry (1918; Jan. 1, 1920-Feb. 29, 1920), Division of College Extension.

B. S. in D. H., 1918.

FLOYD PATTISON, B. S.,

Assistant Professor of Steam and Gas Engineering (Dec. 15, 1919; Jan. 1, 1920), Home Study Service, Division of College Extension.

B. S., 1912.

A 5; 1014 Laramie.

LOUIS COLEMAN WILLIAMS, B. S.,

Assistant Professor of Horticulture (1915; Feb. 1, 1920), Division of College Extension; Assistant Club Leader (1915; 1917-Feb. 1, 1920), Division of College Extension.

B. S., 1912.

H 26; 1110 Vattier.

ROGER CLETUS SMITH, Ph. D.,

Assistant Professor of Entomology (Feb. 1, 1920).

A. B., Miami University, 1911; A. M., Ohio State University, 1914; Ph. D., Cornell University, 1917.

F 64; _____.

FRANK ANDREW DAWLEY,⁹ B. S.,

Assistant County Agent Leader (1917; Jan. 1, 1920), Division of College Extension.

B. S., 1895.

A 2; 303 N. Fourteenth.

ASSOCIATES**FRANK SWARTZ CAMPBELL,¹ B. S.,**

Associate in Food Analysis (Feb. 10, 1919-Dec. 1, 1919).

B. S., 1919.

HOWARD ROBERT DEROSE, A. B.,

Associate in Food Analysis (Oct. 6, 1919; Dec. 1, 1919); Associate in Stock Remedy Analysis (Oct. 6, 1919-Dec. 1, 1919).

A. B., Colorado University, 1918.

CA 30; 346 N. Sixteenth.

CHARLES HENRY GREINER, A. B.,

Associate in Stock Remedy Analysis (Feb. 20, 1920).

A. B., University of Michigan, 1914.

CA 30; 1222 Bluemont.

GEORGE VANDERVEEN, B. S.,

Associate in Feed-stuffs Analysis (Feb. 21, 1920), Agricultural Experiment Station; Assistant Chemist (April 3, 1919-Jan. 1, 1920), Agricultural Experiment Station.

B. S., University of Chicago, 1919.

CA 30; 1623 Anderson.

1. Resigned.

9. Temporary appointment.

INSTRUCTORS

- ANNETTE LEONARD, A. B.,**
Instructor in English (1907, 1909).
A. B., University of Kansas, 1906. A 53; 337 N. Fourteenth.
- WILLIAM LEONARD HOUSE,**
Instructor in Wood Work (1909); Foreman of Carpenter Shop (1888).
S 29; 608 Moro.
- EDWARD GRANT,**
Instructor in Molding (1913); Foreman of Foundry (1913).
S 42; 1733 Laramie.
- INA EMMA HOLROYD, B. S.,**
Instructor in Mathematics (1900, 1914).
B. S., 1897; B. S., Kansas State Normal School, 1916. G 28; 1001 Moro.
- EMMA FLORA FECHT,**
Instructor in Clothing and Textiles (1913, 1914).
Graduate, Bradley Polytechnic Institute, 1912. L 55; 1623 Fairchild.
- DANIEL EMMETT LYNCH,**
Instructor in Forging (1914); Foreman of Blacksmith Shop (1914).
S 38; 1729 Laramie.
- ALICE EDNA SKINNER,⁷ B. S.,**
Instructor in Food Economics and Nutrition (1910; Sept. 1, 1919).
B. S., 1909.
- HELEN LOUISE GREEN,⁴ B. S.,**
Instructor in Food Economics and Nutrition (1912; Sept. 1, 1919).
B. S., Simmons College, 1915.
- EDWARD C. JONES, B. M. E.,**
Instructor in Shop Practice (1916); Foreman of Machine Shop (1916).
B. M. E., Iowa State College, 1905. S 31; 1011 Kearney.
- LOTTIE MILAM, B. S.,**
Assistant Club Leader (1917), Boys' and Girls' Club Work, Division of College Extension.
B. S., Oregon Agricultural College, 1914. A 35; 1419 Laramie.
- JOHN THOMPSON PARKER,**
Instructor in Woodwork (1906, 1917).
S 26; College Heights.
- GRACE CUSHING AVERILL,⁸**
Instructor in Applied Art (1913, 1917).
Graduate, Wisconsin State Normal School, 1906. A 68; 1412 Leavenworth.
- MINNIE SEQUIST, A. B.,**
Specialist in Home Economics, Division of College Extension (1916).
A. B., Kansas State Normal School; Graduate, Stout Institute, 1916.
A 36; 1020 Leavenworth.
- DORIS MARJORIE BUGBEY,¹ Mus. B.,**
Instructor in Theory of Music (1917; Sept. 1, 1919-June 1, 1920).
Mus. B., Conservatory of Music, Oberlin College, 1918. M 4; 535 N. Manhattan.

1. Resigned.

4. Absent on leave, 1919-'20.

7. Absent on leave, first semester, 1919-'20.

8. Absent on leave, Nov. 1, 1919, to June 1, 1920.

EULA BERNICE BUTZERIN,¹ R. N.,

Specialist in Home Economics (1917-Dec. 1, 1919), Division of College Extension.

R. N., School for Nurses, Presbyterian Hospital, Chicago, 1914.

MANFORD W. FURR, B. S.,

Instructor in Highway Engineering (1917).

B. S. in C. E., Purdue University, 1913.

E 55; 816 Pierre.

JOHN B. GINGERY,¹ D. V. M.,

Instructor in Surgery and Medicine (1917; July 1, 1919-Dec. 1, 1919).

D. V. M., 1910.

PAUL REVERE IMEL,¹ B. S.,

Specialist in Pig and Baby Beef Club Work (1917-Dec. 31, 1919), Division of College Extension.

B. S., Purdue University, 1917.

WILMA OREM, A. M.,

Instructor in History and Civics (1917).

B. S., 1910; A. M., University of Michigan, 1916.

G 28; R. R. 3.

MARGARET RUSSEL, A. M.,

Instructor in English (1917).

A. B., Washburn College, 1913; A. M., Columbia University, 1915.

A 54; 1412 Leavenworth.

ELSIE HARRIET SMITH,

Instructor in Piano (1917).

Graduate, Certificate Course, Chicago Musical College, 1909.

M 58; 1512 Leavenworth.

ALBERT JOHN MACK, B. S.,

Instructor in Steam and Gas Engineering (1917).

B. S., 1912.

E 26; 1512 Poyntz.

SUSANNA SCHNEMAYER, B. S.,

Specialist in Home Economics (1917), Extension Schools, Division of College Extension.

B. S., 1909.

A 36; 510 N. Ninth.

KATHERINE KIMMEL,

Instructor in Voice (1917).

Graduate, Battle Creek (Mich.) Conservatory of Music, 1913.

M 52; 1201 Moro.

HERBERT HENLEY HAYMAKER, M. S.,

Instructor in Botany (1917).

B. S., 1915; M. S., University of Wisconsin, 1916.

H 54; 315 N. Sixteenth.

LASSIE LANE,¹

Specialist in Extension Schools (1918 - Oct. 1, 1919), Division of College Extension.

GERTRUDE LYNN,

Specialist in Institutes in Home Economics (1918), Division of College Extension.

Graduate, Kansas State Manual Training Normal School, 1907.

A 36; 1020 Leavenworth.

1. Resigned.

- RENA AURELIA FAUBION,² B. S.,**
 Specialist in Dairying (1918; July 1, 1919), Division of College Extension.
 B. S., 1910. A 36; 1419 Laramie.
- HAROLD SIMONDS,¹ B. S.,**
 Specialist in Horticulture (1918 - Jan. 31, 1920), Division of College Extension.
 B. S., Washington State College, 1916.
- JOSEPHINE CARRIER PERRY, B. S.,**
 Instructor in Food Economics and Nutrition (1916; Sept. 1, 1919).
 B. S., Simmons College, 1914. L 34; 1201 Moro.
- EDWARD STAUNTON WEST, A. B.,**
 Instructor in Chemistry (1917; Sept. 1, 1918).
 A. B., Randolph Macon College, 1917. C 64; 1623 Anderson.
- STELLA MAUDE HARRISS, M. S.,**
 Instructor in Chemistry (1917, 1918).
 B. S., 1917; Graduate, (Peru) Nebraska State Normal School, 1908; M. S., 1919.
 W 26; 804 Moro.
- LOIS EMILY WITHAM, M. S.,**
 Instructor in Bacteriology (1917, 1918).
 B. S., 1916; M. S., 1918. V 53; 1324 Laramie.
- NORA ELIZABETH DALBEY, A. M.,**
 Instructor in Botany (1918).
 A. B., University of Kansas, 1913; A. M., *ibid.*, 1914. H 54; 350 N. Sixteenth.
- ODESSA DELLA DOW, B. S.,**
 Instructor in Chemistry (1918).
 B. S., 1906. C 64; R. R. 1.
- ERNEST BAKER KEITH, B. S.,**
 Instructor in Chemistry (1918).
 B. S., 1913. W 26; 1031 Humboldt.
- ELIAS WARD MARKLE,¹ B. S.,**
 Instructor in Electrical Engineering (1918-Feb. 29, 1920).
 B. S. in E. E., Pennsylvania State College, 1913.
- IZIL ISABEL POLSON, B. S.,**
 Instructor in Industrial Journalism (1918).
 B. S., 1916. K 59; 1111 Bluemont.
- BESS JANE MCKITTRICK, A. B.,**
 Instructor in Mathematics (1918).
 A. B., University of Kansas, 1912. G 28A; 1636 Fairchild.
- ALICE LENORE BROWN, A. B.,**
 Instructor in Zoölogy (1918).
 A. B., University of Kansas, 1916. F 61; 321 N. Fourteenth.

1. Resigned.

2. In coöperation with the U. S. Department of Agriculture.

KATHERINE MAXWELL BOWER, B. S.,

Instructor in English (1918; Nov. 1, 1919); Specialist in Home Economics (1918 - Nov. 1, 1919), Home Study Service, Division of College Extension.

B. S., 1915.

A 54; 510 N. Ninth.

LEON VINCENT WHITE, C. E.,

Instructor in Civil Engineering (1918).

B. S., 1903; C. E., 1918.

E 55; 1733 Anderson.

IRA EARL TAYLOR,¹ C. E.,

Assistant Drainage and Irrigation Engineer (1918 - Dec. 31, 1919), Division of College Extension.

B. S. in C. E., 1913; C. E., 1918.

FRED HARRISON BUNDY,¹

Instructor in Shop Practice (1916; 1919-Mar. 10, 1920).

HERBERT C. STROM,

Instructor in Automobiles (1918, 1919).

S 62; 1209 Poyntz.

LILLIE CILLEY, B. L. S.,

Head Cataloguer in Library (1918, 1919).

A. B., Grinnell College, 1914; B. L. S., University of Illinois, 1917.

F 27; 1725 Fairchild.

MARY MATTIE McDONALD, Ph. B.,

Instructor in Clothing and Textiles (1916, 1919).

Ph. B., University of Chicago, 1916; Graduate, Eastern Illinois State Normal School, 1910; Graduate, Bradley Polytechnic Institute, 1912.

L 64; 1631 Fairchild.

AUBREY DEAKENS CONROW, B. S.,

Assistant Testing Engineer (1919), Department of Applied Mechanics and Machine Design, Engineering Experiment Station.

B. S., 1913.

E 8; R. R. 1.

CLIFF ERRETT AUBEL, M. S.,

Instructor in Animal Husbandry (1919).

B. S., Pennsylvania State College, 1915; M. S., 1917.

Ag 13; 1623 Anderson.

W. PEARL MARTIN,

Specialist in Home Nursing (June 15, 1919), Division of College Extension.

Graduate, Christ Hospital, Topeka.

MARY WINONA WARD,

Instructor in Household Economics and Director of the Cafeteria (1917; July 1, 1919).

K 30; 1641 Fairchild.

HARVEY HARLOWE NININGER,⁹ A. M.,

Specialist in Entomology (June 5 - Sept. 5, 1919), Division of College Extension.

A. B., McPherson College, 1914; A. M., Pomona College, 1916.

EFFIE ADAMS,⁹ B. S.,

Instructor in Institutional Cookery (June 6 - Aug. 8, 1919).

B. S., 1911.

1. Resigned.

9. Temporary appointment.

ALICE LOUISE HUGHES,⁹

Instructor in Public School Music Methods (June 6 - Aug. 8, 1919).
Graduate, Illinois Women's College, 1914.

SAMUEL PATTERSON LYLE,⁹

Instructor in Farm Engineering (June 6 - Aug. 8, 1919).

KATHRYN ANN TUCKER,⁹ B. S.,

Instructor in Lunch Room Management (June 6-28, 1919).
B. S., 1912.

ARMIN MEREDITH DOERNER,¹ B. S.,

Instructor in Horticulture (1916; July 1, 1919 - Feb. 1, 1920).
B. S., Oregon Agricultural College, 1916.

WILLIAM FRANCIS PICKETT, B. S.,

Instructor in Horticulture (1917; July 1, 1919).
B. S., 1917.

1209 Bluemont.

FLOYD W. ATKESON, B. S.,

Instructor in Dairy Husbandry (1918; July 1, 1919).
B. S. in Agr., University of Missouri, 1918.

D 30; 1623 Anderson.

LYMAN RAY VAWTER, D. V. M.,

Instructor in Pathology (1918; July 1, 1919).
D. V. M., 1918.

V 56; 331 N. Seventeenth.

FLOYD ALONZO SMUTZ, B. S.,

Instructor in Drawing (1918; July 1, 1919).
B. S. in Arch., 1914.

S 63; 912 Fremont.

HARRY WORKMAN AIMAN,

Instructor in Carpentry (1918; July 1, 1919).

S 26; 728 Poyntz.

FRED ROBERT BEAUDETTE, D. V. M.,

Instructor in Bacteriology (July 1, 1919).
D. V. M., 1919.

V 53; 1025 Bluemont.

MARION HARRISON,

Instructor in Clothing and Textiles (1914; Sept. 1, 1919).
Graduate, Mechanics Institute, 1913.

L 65; 1201 Moro.

FLORENCE HUNT,

Instructor in Clothing and Textiles (1914; Sept. 1, 1919).
Graduate, Pratt Institute, 1910.

L 64; 1412 Leavenworth.

JOSEPH PRESTWICH SCOTT, D. V. M.,

Instructor (1916; Sept. 1, 1919), Department of Vaccine Laboratories.
B. S., Scientific Gymnasium, Lausanne, Switzerland, 1910; D. V. M., Ohio State University, 1914.

V 2; 1605 Leavenworth.

EDITH LORRAINE BOND, A. B.,

Instructor in Physical Training for Women (1917; Sept. 1, 1919).
A. B., University of Wisconsin, 1917.

N 3; 421 N. Sixteenth.

VERA ANNE McCOY, B. S.,

Instructor in Household Economics (1918; Sept. 1, 1919).
B. S., 1917.

L 28; 1409 Anderson.

1. Resigned.

9. Temporary appointment.

S. FRED PRINCE,

Biological Artist (1918; Sept. 1, 1919).

I —; 805 Kearney.

NINA BESS CURRY,

Instructor in Voice (June 6, 1919; Sept. 1, 1919); Assistant in Music (June 6 to Aug. 8, 1919).

M 52; 1441 Laramie.

CHARLES DEGUIRE CHRISTOPH, A. B.,

Instructor in English (1916; Sept. 1, 1919).

A. B., University of Michigan, 1912.

A 55; 1623 Anderson.

GRACE WAUGH BOWMAN,¹⁰

Instructor in Public Speaking (Sept. 1, 1919).

Graduate, University of Kansas, 1910; Graduate, Leland Powers School of the Spoken Word, Boston, 1912.

G 55; 630 Bluemont.

VINA MARY BRAZLETON, B. M.,

Instructor in Piano (Sept. 1, 1919).

B. M., Bush Conservatory, Chicago, 1918.

Barracks; 900 Leavenworth.

BERENICE FULLER, B. S.,

Instructor in English (Sept. 1, 1919).

B. S., Washburn College, 1904.

A 55; 817 Osage.

HELEN MABEL HANNEN,

Instructor in Violin (Sept. 1, 1919).

Graduate, Malek School of Music, Grand Rapids, Mich., 1917; Graduate, Department of Public School and Community Music, Northwestern University, 1919.

M 53; 1441 Laramie.

MARIE ADALINE HEDRICK, B. L. S.,

Head of Circulation Department in Library (Sept. 1, 1919).

A. B., University of Kansas, 1915; B. L. S., University of Illinois, 1919.

F 31; 421 N. Sixteenth.

LEONARD SINCLAIR HOBBS, B. S.,

Instructor in Steam and Gas Engineering (Sept. 1, 1919).

B. S., Texas College of Agriculture and Mechanic Arts, 1916.

E 27A; 1709 Laramie.

MABEL LOUISE LEFFLER, Mus. B.,

Instructor in Piano (Sept. 1, 1919).

Mus. B., Oberlin Conservatory of Music, 1910.

M 55; 1638 Osage.

EDITH MAUDE LING,

Instructor in Piano (Sept. 1, 1919).

Graduate in Music, Northwestern University, 1916.

A —; 900 Leavenworth.

ARNOLD LEONE LOVEJOY,

Instructor in Voice (Sept. 1, 1919).

M 51; 309 N. Sixteenth.

T. MARK McDONALD, B. S.,

Instructor in Chemistry (Sept. 1, 1919).

B. S., University of Chicago, 1909.

CA 26; 340 N. Sixteenth.

DORA MARIE OTTO,¹⁰ B. S.,

Instructor in Food Economics and Nutrition (1916; Sept. 1, 1919).

B. S., 1911.

L 34; 725 Houston.

10. Temporary appointment, year 1919-'20.

JULES HENRY ROBERT, B. S.,

Instructor in Drawing (1916; Sept. 1, 1919).

B. S., 1914.

E 53; 1623 Anderson.

HERSCHEL SCOTT,¹ M. S.,

Instructor in Soils (Sept. 1, 1919 - Feb. 20, 1920).

B. S. Agr., University of Kentucky, 1915; M. S., 1917.

GABE ALFRED SELLERS, B. S.,

Instructor in Shop Practice (Sept. 1, 1919).

B. S., 1917.

S 62; 1729 Laramie.

WILBUR NEILSON SKOURUP, B. S.,

Instructor in Chemistry (Sept. 1, 1919).

B. S., 1915; A. B., University of Kansas, 1916.

CA 31; 805 Houston.

MARY FIDELIA TAYLOR, B. S.,

Instructor in Physics (Sept. 1, 1919).

B. S., 1919.

C 36; 914 Moro.

HAROLD PARKER WHEELER,

Instructor in Orchestral and Band Instruments (Sept. 1, 1919); Band Leader (Sept. 1, 1919).

M 29; 1018 Leavenworth.

ANDREW WINTER,

Instructor in Automobiles (Sept. 1, 1919).

E 52A; 1200 Bertrand.

BRENTON CREAMER ZIMMERMAN, M. S. Agr.,

Instructor in Animal Husbandry (Sept. 1, 1919).

B. S. in Agr., Ohio State University, 1917; M. S. Agr., University of Missouri, 1918.
Ag 13A; 1709 Laramie.

MERRILL AUGUSTUS DURLAND, B. S.,

Instructor in Mechanical Drawing (Sept. 10, 1919).

B. S., 1918.

S 63; 1116 Bluemont.

JOHN DWIGHT PARSONS, B. S.,

Instructor in Farm Engineering (Sept. 15, 1919).

B. S. in M. E., 1915.

R 54; 616 Poyntz.

MIRIAM RUSSELL SPICER, A. B.,

Instructor in Chemistry (Sept. 22, 1919).

A. B., University of Kansas, 1917.

CA 26; 335 N. Fifteenth.

WILLIAM MAX McLEOD, D. V. M.,

Instructor in Anatomy and Physiology (Oct. 1, 1919).

D. V. M., Iowa State College, 1917.

V 32; 413 Houston.

OHMER ROGER MILLER,¹⁰ B. S.,

Instructor in Physics (Oct. 9, 1919).

B. S. in E. E., 1918.

C 61; 1219 Bluemont.

MYRTIE VAN DEUSEN ROUSE,⁹ A. M.,

Instructor in Food Economics and Nutrition (Oct. 27, 1919 - Jan. 24, 1920).

B. S., Columbia University, 1912; A. M., *ibid.*, 1916.

1. Resigned.

9. Temporary appointment.

10. Temporary appointment, 1919-'20.

EARL ALBERT MARTIN,¹⁰ A. M.,

Instructor in Zoölogy (Nov. 1, 1919).

A. B., University of Missouri, 1914; A. M., *ibid.*, 1916.

EDWIN JACOB FRICK, D. V. M.,

Instructor in Surgery and Medicine (Dec. 1, 1919).

D. V. M., Cornell University, 1918.

V 33; 1623 Anderson.

NORTON LEWIS HARRIS,

Instructor in Poultry Husbandry (Feb. 1, 1920), Division of College Extension.

Ag 38A; ———.

ANNETTE WOODWARD PERRY,⁹ B. S.,

Instructor in History and Civics (Feb. 10 - June 1, 1920).

B. S., 1916.

EUGENE SIDNEY LYONS, B. S.,

Instructor in Soils (Feb. 23, 1920).

B. S., 1920.

Ag 55; 1000 Laramie.

HELEN W. FORD, B. S.,

Instructor in Household Economics (April 15, 1920), Home Study Service, Division of College Extension.

B. S., Rhode Island State College, 1914.

A 5A; ———.

ASSISTANTS

JESSIE GULICK,

Assistant Cataloguer in Library (1907, 1911).

F 27; 421 N. Sixteenth.

ALANSON LOLA HALLSTEAD, B. S.,

Assistant in Dry Farming (1910), Fort Hays Branch Agricultural Experiment Station.

B. S., 1903.

Hays, Kan.

BRUCE STEINHOFF WILSON, B. S.,

Assistant in Coöperative Experiments (1910, 1912).

B. S., 1908.

Ag 60; 514 N. Manhattan.

ASHER EULESTA LANGWORTHY, Ph. C.,

Feeding-stuffs Inspector (1912), Agricultural Experiment Station.

Ph. C., University of Kansas, 1911.

Ag 26; 1709 Laramie.

ROBERT GETTY,² B. S. A.,

Assistant in Forage Crops (1913), Fort Hays Branch Agricultural Experiment Station.

B. S. A., University of Nebraska, 1913.

Hays, Kan.

WILLIAM PATRICK HAYES, M. S.,

Assistant in Entomology (1913, 1914).

B. S., 1913; M. S., 1918.

F 54A; 319 Denison.

2. In coöperation with the U. S. Department of Agriculture.

9. Temporary appointment.

10. Temporary appointment, 1919-'20.

OTIS EVERETT STRODTMAN,² D. V. S.,

Deputy Inspector and College Representative (1914), Marshall County
Cholera Eradication Project.

D. V. S., Kansas City Veterinary College, 1911.

Marysville, Kan.

HUGH DURHAM, A. M.,

Assistant to the Dean of the Division of Agriculture (1915); Assistant
to the Director of the Agricultural Experiment Station (1915, 1918).

Graduate, Kansas State Normal School, 1901; A. B., University of Kansas, 1909;
A. M., *ibid.*, 1915. Ag 30; 730 Osage.

MABEL GERTRUDE BAXTER,

Class Reserves Assistant in Library (1916).

F 31; 1624 Fairchild.

LESTER HENRY DRAYER,

Assistant in Heat and Power (1916).

E 3; 1201 Kearney.

LENA LETITIA PRICE,

Assistant to the President (1912; July 1, 1919).

A 30; 1642 Fairchild.

ELIZABETH PERRY HARLING,

Seed Analyst (1912, 1917).

Ag 77; 628 Fremont.

GRACE ROBERTA HESSE, A. B.,

Assistant in Modern Languages (1917).

A. B., University of Michigan, 1917.

N 60; 1409 Anderson.

HARRIET WRIGHT ALLARD,

Assistant in Home Economics (1917), Extension Schools, Division of
College Extension.

A 36; 510 N. Ninth.

HENRY JAMES ALLEN,

Assistant in Heat and Power (1914, 1917).

E 27; 330 Vattier.

GEORGE HERBERT PHINNEY,

Assistant in Agronomy (1917); Foreman of Agronomy Farm (1917).

Graduate, Topeka Business College, 1903.

Agronomy Farm.

CHESTER WILLIS OAKES,

Miller, Department of Milling Industry (1918).

Ag 26C; 1031 Vattier.

HAROLD ARTHUR PRATT,¹ B. S.,

Assistant in Horticulture (1918-Feb. 1, 1920); Foreman of Green-
houses (1918-Feb. 1, 1920).

B. S., Massachusetts Agricultural College, 1917.

CYRUS EARL BUCHANAN,

Assistant in Feed Control (1912, 1918).

Ag 26A; 521 Vattier.

MABLE CALDWELL, B. S.,

Assistant to Superintendent of Institutes and Extension Schools
(1918), Division of College Extension.

B. S., Oklahoma College of Agriculture and Mechanic Arts, 1918.

A 34; 1408 Fairchild.

1. Resigned.

2. In coöperation with the U. S. Department of Agriculture.

- CORA ALBERTA PITMAN, B. S.,**
Assistant to the Registrar (1918).
B. S. in H. E., 1916. A 29; 730 Yuma.
- RUTH EVALYN HURD, B. S.,**
Assistant in Zoölogy (1918).
B. S., Carthage College, 1918. F 55; 317 N. Seventeenth.
- BRUCE BUNYAN SMITH,**
Assistant in Farm Engineering (1918).
R 26; 830 Laramie.
- NATHAN DANIEL HARWOOD, D. V. M.,**
Assistant in Vaccine Laboratories (1918; July 1, 1919).
D. V. M., 1918. V 32; 340 N. Sixteenth.
- GEORGE CALVIN GIBBONS,¹ B. S.,**
Assistant to Superintendent (1918-Oct. 31, 1919), Fort Hays Branch
Agricultural Experiment Station.
B. S. in Agr., 1918.
- MARTHA LIVINGSTON DENNY, A. M.,**
Assistant in Zoölogy (1918); Assistant in Genetics (1918), Agricultural
Experiment Station.
A. B., Indiana University, 1917; A. M., *ibid.*, 1919. Insectary; 1430 Poyntz.
- MARGARET ELEANOR MOORE, B. S.,**
Assistant in Blackleg Vaccine Production (1918).
B. S., 1914. V 24; 1214 Bluemont.
- MORRILL THORNTON DOW, B. S.,**
Assistant in Physics (1918).
B. S., Ottawa University, 1917. C 39; 1100 Moro.
- FRANK MARION AIMAN,**
State Feeding-stuffs Inspector (1919).
Ag 26B; 528 Laramie.
- EDDIE GRANELL,**
Assistant in Shop Practice (1919).
S 38; 809 Vattier.
- SAMUEL JAMES MOLBY,**
Assistant in Farm Engineering (1919).
B. S., 1917; B. S. in Agr., 1918.
- CLARENCE ROY JACCARD, B. S.,**
Nurseryman (1919), Fort Hays Branch Agricultural Experiment
Station.
B. S. in Agr., 1914. Hays, Kan.
- SELMA MARIE FOBERG,**
Office Assistant to the Dean (Apr. 1, 1919), Division of College Ex-
tension.
A 33; 1743 Fairchild.
- WILLIAM PRESTON TUTTLE,⁹ B. S. A.,**
Assistant in Soil Survey (June 1-June 26, 1919).
B. S. A., University of Kentucky, 1915.

1. Resigned.

9. Temporary appointment.

ESTHER FAYMAN,

Secretary to the President (June 1, 1919).

A 30; 1425 Laramie.

GEORGE YOEMAN BLAIR,⁹ B. S.,

Assistant in Soil Survey (June 26, 1919-Dec. 31, 1919).

B. S., 1919.

CLARA ELIZABETH HIGGINS, B. S.,

Research Assistant in Poultry Husbandry (July 1, 1919).

B. S., 1919.

Poultry Farm; 1423 Fairchild.

ALICE MAUDE MELTON, B. S.,

Secretary to the Dean of the Division of General Science (July 1, 1919).

B. S., 1898.

A 49; 804 Moro.

JOHN VICTOR ROLANDER,

Assistant in Heat and Power (July 1, 1919).

E 27; 517 Kearney.

RAYMOND HAZELTON WHITENACK, B. S.,

Deputy State Dairy Commissioner (July 1, 1919).

B. S., 1916.

X 26; 1216 Laramie.

MADGE GLADYS AUSTIN,¹ B. S.,

Class Reserves Assistant in Library (Sept. 1 - Dec. 1, 1919).

B. S., 1919.

GEORGIA KILBOURN BALDWIN, B. S.,

Assistant in Household Economics (Sept. 1, 1919).

B. S., 1913.

K 30; 714 Poyntz.

WINIFRED BARTHOLF, A. B.,

Assistant in Physical Education (Sept. 1, 1919).

A. B., University of Wisconsin, 1919.

N 3; 1824 Humboldt.

FREDERICK HERBERT BUDDEN,

Laboratory Assistant in Applied Mechanics and Machine Design (1917; Sept. 1, 1919).

E 8; R. R. 2.

EDWARD L. CLAEREN,

Secretary to the Commandant (1910; Sept. 1, 1919).

N 27; 900 Pierre.

PERCY LEROY DEPUY, B. S.,

Assistant in Zoölogy (Sept. 1, 1919).

B. S., 1918.

F 5; 1725 Leavenworth.

LOUISE HELEN EVERHARDY,

Assistant in Applied Art (Sept. 1, 1919).

A 67B; 1417 Laramie.

BLANCH SHIRLEY FRENCH,² B. S.,

Research Assistant in Agricultural Economics (Sept. 1, 1919).

B. S., 1919.

Ag 51A; 1423 Fairchild.

EARL MARTIN HIESTAND,² B. S.,

Research Assistant in Agricultural Economics (Sept. 1, 1919).

B. S., 1919.

Holton, Kan.

1. Resigned.

2. In coöperation with the U. S. Department of Agriculture.

9. Temporary appointment.

- CARL FOUNTAIN HUFFMAN, B. S.,**
Assistant in Dairy Husbandry (Sept. 1, 1919).
B. S., 1917. D 30; 1623 Anderson.
- CHARLES HOWARD KITSELMAN, D. V. M.,**
Assistant in Pathology.
D. V. M., University of Pennsylvania, 1918. V 58; 1015 Fremont.
- RUTH EUGENIA SANKEE, A. B.,**
Reference Assistant in Library (Sept. 1, 1919).
A. B., University of Kansas, 1914. F 35; 1419 Laramie.
- RUTH KATHRYN TRAIL, B. S.,**
Assistant in Food Economics and Nutrition (Sept. 1, 1919).
B. S., Connecticut College for Women, 1919. L 53; 730 Osage.
- GRACE ELLEN UMBERGER, B. S., R. N.,**
Assistant to the College Physician (Sept. 1, 1919).
[B. S., 1905; R. N., Illinois Training School for Nurses, 1909. A 65; 1104 Vattier.
- MARION JULIA WILLIAMS, B. S.,**
Assistant in Food Economics and Nutrition (Sept. 1, 1919).
B. S., Connecticut College for Women, 1919. L 53; 319 N. Fifth.
- EDITH WILLMANN, A. B.,**
Assistant in Zoölogy (Sept. 1, 1919).
A. B., Barnard College, Columbia University, 1919. F 62; 800 Houston.
- MARY ABBIE WORCESTER, B. S.,**
Assistant in Clothing and Textiles (Sept. 1, 1919).
B. S., New Hampshire College, 1917. L 65; 1725 Fairchild.
- FRANCIS GEORGE WELCH, B. S.,**
Assistant in Animal Husbandry (Sept. 6, 1919), Home Study Service,
Division of College Extension.
B. S., Kansas State Normal School, 1918. A 5; 1224 Fremont.
- CHARLES CLAIRMONT VASEY, B. S.,**
Deputy State Dairy Commissioner (Sept. 22, 1919).
B. S., University of Nebraska, 1917. X 26; 1416 Laramie.
- MARY AVIS BLAIN, B. S.,**
Assistant in Physical Education for Women (Sept. 29, 1919).
B. S., 1919. N 3; 343 N. Fourteenth.
- DOROTHY JOSEPHINE CASHEN, B. S.,**
Assistant in Botany (Sept. 29, 1919).
B. S., Carthage College, 1917. H 57B; 1015 Fremont.
- ALBERT HARRISON KERNS,**
Assistant to the Superintendent (Nov. 1, 1919), Fort Hays Branch
Agricultural Experiment Station.
Hays, Kan.
- MARY ISABEL SCHELL,⁹**
Assistant in Applied Art (Nov. 5, 1919 - May 31, 1920).
Normal Graduate, Art Institute, Chicago, Ill., 1919.

9. Temporary appointment.

LUELLA CORY, A. B.,

General Assistant in Library (Nov. 24, 1919).

A. B., University of Kansas, 1916.

F 3; 1419 Laramie.

HUBERT ALOYSIUS McNAMEE,⁹

Assistant in Farm Engineering (Dec. 1, 1919 - Mar. 1, 1920).

Graduate, Air Service Mechanics School, 1918.

FLORENCE LILLIAN DIAL, B. S.,

General Assistant in Library (Dec. 1, 1919).

B. S., 1919.

F 3; 1030 Moro.

CHARLES RANGER ENLOW, B. S.,

Research Assistant in Agricultural Economics (Dec. 15, 1919).

B. S., 1920.

McPherson, Kan.

JOSEPH NATHANIEL LUDEN,⁹

Assistant in Farm Engineering (Jan. 1 - Mar. 1, 1920).

MORRIS EVANS,⁹

Teaching Assistant in Agricultural Economics (Jan. 1-May 31, 1920).

Ag 51A; 1504 Humboldt.

STANLEY PAUL HUNT,⁹ B. S.,

Assistant in Applied Mechanics (Jan. 26 - May 31, 1920).

B. S., 1919.

S 63; 619 Thurston.

LORPAID CARL TEETER,⁹ B. S.,

Assistant in Applied Mechanics (Jan. 26 - May 31, 1920).

B. S., 1917.

S 63; 614 Bluemont.

GLADYS GARNAND RUDE, B. S.,

Assistant in Zoölogy (Feb. 1, 1919).

B. S., 1919.

F 64; 344 N. Fifteenth.

ROBERT McKINLEY GOODWIN,⁹

Assistant in Farm Engineering (Mar. 1 - May 31, 1920).

R 28; 724 Laramie.

JOHN WORLEY TATTERSHALL,

Assistant in Heat and Power (Mar. 1, 1920).

E 26B; 831 Laramie.

PERTTU HANNES VIRTANEN, B. S.,

Assistant in Horticulture (July 1, 1920).

B. S., 1920.

SUPERINTENDENTS

JACOB LUND, M. S.,

Superintendent of Heat and Power (1893, 1901); Custodian of Buildings and Grounds (1893, 1917).

B. S., 1883; M. S., 1886.

E 26B; 1414 Fairchild.

9. Temporary appointment.

CHARLES ROZELL WEEKS, B. S.,

Superintendent (1916), Fort Hays Branch Agricultural Experiment Station (1916).

B. S., University of Nebraska, 1907; B. Ed., Nebraska State Normal School, Peru, Neb., 1912. Hays, Kan.

JOHN JASPER BAYLES, B. S.,

Superintendent (1918), Colby Branch Agricultural Experiment Station.

B. S., 1915.

Colby, Kan.

CARL IVAR MATTSON,¹

Superintendent (1918 - Mar. 1, 1919), Tribune Branch Agricultural Experiment Station.

Tribune, Kan.

HAROLD BAYLISS MUGGLESTONE,

Superintendent of Poultry Farm (1918).

Poultry Farm.

CHARLES WESLEY HOBBS, D. V. S.,

Superintendent of Vaccine Laboratories (1913; July 1, 1919).

D. V. S., Western Veterinary College, 1901.

V 31; 303 N. Sixteenth.

GEORGE RICHARD PAULING,

Superintendent of Building and Repair (1916; July 1, 1919).

S 34; 1017 Fremont.

FAY ARTHUR WAGNER, B. S.,

Superintendent (July 1, 1919), Garden City Branch Agricultural Experiment Station.

B. S. in Agr., New Mexico Agricultural College, 1916.

Garden City, Kan.

G. E. LOWREY,

Superintendent (Mar. 1, 1920), Tribune Branch Agricultural Experiment Station.

Tribune, Kan.

AGRICULTURAL AGENTS²

WILLIAM ARMFIELD BOYS, B. S.,

Sumner County Agricultural Agent (1912, 1918), Division of College Extension.

B. S., 1904.

Wellington, Kan.

EVEREST JOHN MACY, B. S.,

Sedgwick County Agricultural Agent (1913, 1918), Division of College Extension.

B. S., Earlham College, 1904.

Wichita, Kan.

OTTO C. HAGANS,¹ B. S.,

Atchison County Agricultural Agent (1914, 1918 - Dec. 31, 1919), Division of College Extension.

B. S., 1914.

Effingham, Kan.

VALENTINE MEACHAM EMMERT, B. S.,

McPherson County Agricultural Agent (1916), Division of College Extension.

B. S., 1901.

McPherson, Kan.

1. Resigned.

2. All agricultural agents are employed coöperatively by the College and the U. S. Department of Agriculture, and in case of county agents in coöperation with the county farm bureaus.

RAYMOND OLIVER SMITH, B. S.,

Douglas County Agricultural Agent (1916; Jan. 10, 1920), Division of College Extension; Wilson County Agricultural Agent (1916-Jan. 9, 1920), Division of College Extension.

B. S. in Agr., University of Nebraska, 1915.

Lawrence, Kan.

RALPH POWELL SCHNACKE, B. S.,

Pawnee County Agricultural Agent (1916), Division of College Extension.

B. S., 1916.

Larned, Kan.

IRA NICHOLS CHAPMAN, B. S.,

Leavenworth County Agricultural Agent (1916), Division of College Extension.

B. S., 1916.

Leavenworth, Kan.

PRESTON ORIN HALE,¹ B. S.,

Chase County Agricultural Agent (1917 - Jan. 31, 1920), Division of College Extension.

B. S., 1916.

Cottonwood Falls, Kan.

RAYMOND WALTER SCHAFER, M. S.,

Washington County Agricultural Agent (1917), Division of College Extension.

B. S., 1914; M. S., University of Wisconsin, 1917.

Washington, Kan.

FLOYD JOE ROBBINS, B. S.,

Franklin County Agricultural Agent (1917), Division of College Extension.

B. S., 1913.

Ottawa, Kan.

WILHELM ALEXANDER WUNSCH,¹ B. S.,

Harvey County Agricultural Agent (1917, 1918 - Feb. 29, 1920), Division of College Extension.

B. S., 1917.

Newton, Kan.

WILBUR WILLIAM WRIGHT, B. S.,

Greenwood County Agricultural Agent (1917, 1918), Division of College Extension.

B. S., 1917.

Eureka, Kan.

CHARLES D. THOMPSON, B. S. D.,

Neosho County Agricultural Agent (1918), Division of College Extension.

B. S. D., Warrensburg (Mo.) State Normal School, 1895.

Erie, Kan.

ALBERT CECIL HANCOCK,¹ B. S.,

Cherokee County Agricultural Agent (1918 - Sept. 30, 1919), Division of College Extension.

B. S. in Agr., 1918.

St. Francis, Kan.

EDWIN ISAAC MARIS, B. S.,

Rawlins County Agricultural Agent (1918), Division of College Extension.

B. S., 1916.

Atwood, Kan.

EARL JOSEPH WILLIS,¹ B. S.,

Cherokee County Agricultural Agent (1918 - Sept. 30, 1919), Division of College Extension.

B. S., 1914.

Columbus, Kan.

JOHN W. THORNBURGH,¹ C. E.,

Hodgeman County Agricultural Agent (1918 - Sept. 30, 1919), Division of College Extension.

C. E., Campbell College, 1888.

Jetmore, Kan.

AVERY CLEVELAND MALONEY, B. S.,

Bourbon County Agricultural Agent (1918), Division of College Extension.

B. S., 1918.

Fort Scott, Kan.

EDWARD H. LEKER, B. S. A.,

Jackson County Agricultural Agent (1918), Division of College Extension.

B. S. A., University of Missouri, 1917.

Holton, Kan.

HERBERT LYNNE HILDWEIN, B. S.,

Kingman County Agricultural Agent (1917, 1918), Division of College Extension.

B. S., 1914.

Kingman, Kan.

HAYS MARION COLE,

Montgomery County Agricultural Agent (1918), Division of College Extension.

Independence, Kan.

FRANK SUMNER TURNER, B. S.,

Anderson County Agricultural Agent (1918), Division of College Extension.

B. S., 1917.

Garnett, Kan.

JOE MYRON GOODWIN,

Jefferson County Agricultural Agent (1919), Division of College Extension.

Valley Falls, Kan.

LOUIS EDWARD HOWARD,¹ B. S.,

Pratt County Agricultural Agent (1919), Division of College Extension.

B. S., 1917.

Pratt, Kan.

JACOB MICHAEL MURRAY,¹ D. V. M.,

Nemaha County Agricultural Agent (Jan. 1 - Oct. 31, 1919), Division of College Extension.

D. V. M., 1908.

Seneca, Kan.

GEORGE W. SALISBURY, B. S.,

Labette County Agricultural Agent (1919), Division of College Extension.

B. S., University of Illinois, 1915.

Altamont, Kan.

FRANK OTTO BLECHA, B. S.,

Shawnee County Agricultural Agent (1919), Division of College Extension.

B. S., 1918.

Topeka, Kan.

GAYLORD HANCOCK,

Lyon County Agricultural Agent (1919), Division of College Extension.

Emporia, Kan.

1. Resigned.

THOMAS E. CLARKE,¹ B. S.,

Barber County Agricultural Agent (Mar. 5 - Dec. 31, 1919), Division of College Extension.

B. S., 1910.

Medicine Lodge, Kan.

JOSEPH VINCENT QUIGLEY,¹ B. S.,

Miami County Agricultural Agent (Mar. 15 - Nov. 30, 1919), Division of College Extension.

B. S., 1916.

Paola, Kan.

THEODORE W. THORDARSON, B. S.,

Barton County Agricultural Agent (1919), Division of College Extension.

B. S., North Dakota Agricultural College, 1916.

Great Bend, Kan.

AMWEL EDWIN JONES,¹ B. S.,

Jewell County Agricultural Agent (1919 - Jan. 31, 1920), Division of College Extension.

B. S., 1915.

Mankato, Kan.

FRANK HAROLD DILLENBACK, B. S.,

Doniphan County Agricultural Agent (1919), Division of College Extension.

B. S., 1916.

Troy, Kan.

ERNEST HENRY PTACEK,¹ B. S.,

Douglas County Agricultural Agent (Apr. 1 - Oct. 31, 1919), Division of College Extension.

B. S., 1918.

Lawrence, Kan.

JOHN LAWRENCE GARLOUGH,¹ B. S.,

Marion County Agricultural Agent (May 5 - Sept. 14, 1919), Division of College Extension.

B. S., 1916.

EMMETT L. GARRETT, B. S. A.,

Comanche County Agricultural Agent (May 22, 1919), Division of College Extension.

B. S. A., Oklahoma A. and M. College, 1915.

Coldwater, Kan.

HENRY JOSEPH ADAMS, B. S.,

Gray County Agricultural Agent (1917; June 27, 1918), Division of College Extension.

B. S., 1917.

Cimarron, Kan.

CHARLES ELMER CASSEL, B. S.,

Finney County Agricultural Agent (1912; Aug. 16, 1917), Division of College Extension.

B. S., 1910.

Garden City, Kan.

LUTHER EARL WILLOUGHBY, B. S.,

District Agricultural Agent (1917; Jan. 25, 1919), West Central Kansas, Division of College Extension.

B. S., 1912; B. S. in Agr., 1916.

Hays, Kan.

JOHN VERN HEPLER,¹ B. S.,

Ford County Agricultural Agent (1917; July 1 - Nov. 30, 1919), Division of College Extension.

B. S., 1915.

1. Resigned.

HARRY SCOTT WILSON,

Johnson County Agricultural Agent (1917; July 1, 1919), Division of
College Extension.

Olathe, Kan.

GEORGE W. SIDWELL,¹

Greeley County Agricultural Agent (1918; July 1 - Nov. 30, 1919),
Division of College Extension.

ALBERT BARNEY KIMBALL, B. S.,

Clark County Agricultural Agent (1918; July 1, 1919), Division of
College Extension.

B. S., 1889.

Ashland, Kan.

AMBROSE DICKSON FOLKER, B. S.,

Wyandotte County Agricultural Agent (July 1, 1919), Division of Col-
lege Extension.

B. S., Iowa State College, 1911.

Kansas City, Kan.

ROBERT ELLIOTT CURTIS, B. S.,

Clay County Agricultural Agent (July 1, 1919), Division of College
Extension.

B. S., 1916.

Clay Center, Kan.

JAMES HENDRIX McADAMS, B. S.,

Coffey County Agricultural Agent (July 14, 1919), Division of College
Extension.

B. S., 1916.

Burlington, Kan.

WILLIAM LOUIS TAYLOE, B. S. A.,

Morris County Agricultural Agent (July 15, 1919), Division of College
Extension.

B. S. A., University of Missouri, 1917.

Council Grove, Kan.

CARL VINCENT MALONEY, B. S.,

Meade County Agricultural Agent (Sept. 1, 1919), Division of College
Extension.

B. S., 1919.

Meade, Kan.

RAYMOND FRANKLIN OLINGER, B. S.,

Marion County Agricultural Agent (Sept. 15, 1919), Division of Col-
lege Extension.

B. S., 1913.

Marion, Kan.

ORVILLE THOMAS BONNETT, B. S.,

Marshall County Agricultural Agent (Nov. 10, 1919), Division of Col-
lege Extension.

B. S., 1918.

Blue Rapids, Kan.

FRED A. BILLHIMER,

Wichita - Greeley County Agricultural Agent (Dec. 22, 1919), Division
of College Extension.

Leoti, Kan.

BENJAMIN FRANCIS BARNES, B. S.,

Cherokee County Agricultural Agent (Jan. 15, 1920), Division of Col-
lege Extension.

B. S., 1918.

Columbus, Kan.

1. Resigned.

HERMAN FREDERICK TAGGE, B. S.,

Atchison County Agricultural Agent (Feb. 1, 1920), Division of College Extension.

B. S., 1914.

Effingham, Kan.

WILLIAM HURBERT BROOKS, B. S.,

Miami County Agricultural Agent (Feb. 1, 1920), Division of College Extension.

B. S., 1920.

Paola, Kan.

JOHN ALBERT HENDRICKS, B. S. A.,

Chase County Agricultural Agent (Feb. 1, 1920), Division of College Extension.

B. S. A., Iowa State College, 1913.

Cottonwood Falls, Kan.

ERNEST LEE McINTOSH, B. S.,

Nemaha County Agricultural Agent (Feb. 1, 1920), Division of College Extension.

Seneca.

HARRY CHARLES BAIRD, B. S.,

Ford County Agricultural Agent (Feb. 10, 1920), Division of College Extension.

B. S., 1914.

Dodge City, Kan.

TELFORD REDDELL PHARR, B. S.,

Jewell County Agricultural Agent (Feb. 10, 1920), Division of College Extension.

B. S., 1920.

Mankato, Kan.

HOMER BRYAN WILLIS, B. S.,

Barber County Agricultural Agent (Feb. 10, 1920), Division of College Extension.

B. S., 1920.

Medicine Lodge, Kan.

CLARENCE OWEN GRANFIELD, B. S.,

Wilson County Agricultural Agent (Mar. 1, 1920), Division of College Extension.

B. S., 1917.

Fredonia, Kan.

HOME DEMONSTRATION AGENTS²

ELSIE LORETTA BAIRD,¹ B. S.,

Anderson County Home Demonstration Agent (1917; July 1, 1919 - Feb. 29, 1920), Division of College Extension.

B. S., 1915.

Garnett, Kan.

MOLLIE LINDSEY,

Ness County Home Demonstration Agent (1917; July 1, 1919), Division of College Extension.

Ness City, Kan.

MAUDE MILDRED COE, B. S.,

McPherson County Home Demonstration Agent (1917; July 1, 1919), Division of College Extension.

B. S., 1902.

McPherson, Kan.

1. Resigned.

2. In coöperation with the U. S. Department of Agriculture.

EDITH ANTONETTE HOLMBERG, B. S.,

Morris County Home Demonstration Agent (1918; July 1, 1919),
Division of College Extension.

B. S., 1908.

Council Grove, Kan.

IRENE ALMA TAYLOR, B. S.,

Shawnee County Home Demonstration Agent (1918; July 1, 1919),
Division of College Extension.

B. S., 1908.

Topeka, Kan.

SARA JANE PATTON, B. S.,

Cherokee County Home Demonstration Agent (1918; July 1, 1919),
Division of College Extension.

B. S., 1915.

Columbus, Kan.

ELLEN MARGARET BATCHELOR, B. S.,

Atchison County Home Demonstration Agent (1917; Sept. 1, 1919),
Division of College Extension.

B. S., 1911.

Effingham, Kan.

ETHEL McDONALD, B. S.,

Meade County Home Demonstration Agent (Sept. 1, 1919), Division of
College Extension.

B. S., 1907.

Meade, Kan.

COUNTY LEADERS IN BOYS' AND GIRLS' CLUB WORK**CHARLES A. BOYLE,¹**

Lyon County Club Leader (1917; July 1 - Oct. 31, 1919), Division of
College Extension.

JESSIE STEVENS McCAFFERTY,

Jefferson County Club Leader (1918; July 1, 1919), Division of Col-
lege Extension.

Oskaloosa, Kan.

LOLA BELLE THOMPSON,¹² A. B.,

Rice County Club Leader (1918; July 1, 1919), Division of College
Extension.

A. B., College of Emporia, 1916.

Lyons, Kan.

JESSIE GERTRUDE ADEE,

Ottawa County Club Leader (1918; Aug. 1 - Sept. 30, 1919), Division
of College Extension.

Delphos, Kan.

JOHN LAWRENCE PREHN,¹

Poultry Club Leader (June 1-Dec. 31, 1919), Division of College Ex-
tension.

FLORENCE WHIPPLE, B. S.,

Leavenworth County Club Leader (July 15, 1919), Division of College
Extension.

B. S., 1912.

Leavenworth, Kan.

1. Resigned.

12. Assistant Club Leader, Feb. 1 to 29, 1920.

FELLOWS

EMILY HARRIET ANDERSON, B. S.,

Fellow in Household Economics (Sept. 1, 1919).

B. S., University of Wyoming, 1919.

L 53; 1408 Fairchild.

WILLIAM CHARLES BELLIS, B. S.,

Fellow in Animal Husbandry (Sept. 1, 1919).

B. S., University of Arizona, 1919.

Ag 13; 1623 Anderson.

ERNEST EDWARD DALE, A. B.,

Fellow in Botany (1917; Sept. 1, 1919).

A. B., University of Nebraska, 1913.

H 56A; 1623 Anderson.

HENRY WHITE MARSTON, B. S. A.,

Fellow in Animal Husbandry (Sept. 1, 1919).

B. S. A., Delaware State College, 1919.

Ag 13; 1020 Leavenworth.

CLARA VICTORIA THOMAS, A. B.,

Fellow in Food Economics and Nutrition (Sept. 1, 1919).

A. B., Nebraska Wesleyan University, 1919.

L 53; 1408 Fairchild.

OTHER OFFICERS

JESSIE McDOWELL MACHIR,

College Registrar (1913).

A 29; 1641 Fairchild.

STEPHEN ARNOLD GEAUQUE,

Assistant Custodian (1918; July 1, 1919).

G 33; 420 Humboldt.

Agricultural Experiment Station

OFFICERS OF THE STATION

W. M. JARDINE, President of the College.

ADMINISTRATION—

F. D. FARRELL, Director.

JAMES A. KIMBALL, Business Manager.

HUGH DURHAM, Assistant to Director.

AGRICULTURAL ECONOMICS—

W. E. GRIMES, Farm Management, in Charge.

F. L. THOMSEN, Marketing.

AGRONOMY—

L. E. CALL, in Charge (since Sept. 1, 1919).

S. C. SALMON, Crops, in Charge (till Sept. 1, 1919).

R. I. THROCKMORTON, Soils.

J. H. PARKER, Plant Breeding.

M. C. SEWELL, Soils.

R. L. HENSEL, Pasture Investigations.

J. W. ZAHNLEY, Crops.

B. S. WILSON, Coöperative Experiments.

G. H. PHINNEY, Farm Foreman.

ELIZABETH HARLING, Seed Analyst.

ANIMAL HUSBANDRY—

C. W. McCAMPBELL, Cattle, in Charge.

H. L. IBSEN, Animal Breeding.

F. W. BELL, Horse Investigations.

E. F. FERRIN, Swine Investigations.

A. M. PATERSON, Sheep Investigations.

H. B. WINCHESTER, Feeding Investigations.

BACTERIOLOGY—

L. D. BUSHNELL, in Charge.

O. W. HUNTER, Dairy Bacteriology.

P. L. GAINEY, Soil Bacteriology.

F. R. BEAUDETTE, Poultry Disease Investigations.

BOTANY—

L. E. MELCHERS, Plant Pathology, in Charge.

E. C. MILLER, Plant Physiology.

CHEMISTRY—

H. H. KING, in Charge.

J. T. WILLARD, Consulting Chemist.

C. O. SWANSON, General Investigations.

W. L. LATSHAW, Soil, Feeding-stuffs, and Fertilizer Analysis.

E. L. TAGUE, Protein Investigations.

J. S. HUGHES, Animal Nutrition.

GEORGE VANDERVEEN, Feeding-stuffs Analysis.

C. H. GREINER, Live-stock Remedy Analysis.

———, Animal Nutrition.

DAIRY HUSBANDRY—

J. B. FITCH, in Charge.
H. W. CAVE, Dairy Production.
N. E. OLSON, Dairy Manufactures.
F. W. ATKESON, Supervisor Advanced Registry Testing.
H. M. JONES, State Dairy Commissioner.
R. H. WHITENACK, Deputy Dairy Commissioner.
C. C. VASEY, Deputy Dairy Commissioner.
C. O. BIGFORD, Herdsman.

ENTOMOLOGY—

G. A. DEAN, in Charge.
J. H. MERRILL, Fruit Insect Investigations.
J. W. MCCOLLOCH, Staple Crop Insect Investigations.
W. P. HAYES, Staple Crop Insect Investigations.
M. C. TANQUARY, Staple Crop Insect Investigations (till Feb. 1, 1920).
ROGER C. SMITH, Staple Crop Insect Investigations (since Feb. 1, 1920).

HORTICULTURE—

ALBERT DICKENS, in Charge.
M. F. AHEARN, Vegetables and Forcing Crops.
W. F. PICKETT, Orchard Investigations.

MILLING INDUSTRY—

L. A. FITZ, in Charge.
LEILA DUNTON, Wheat and Flour Investigations.
C. W. OAKES, Miller.
A. E. LANGWORTHY, Feed Control.
F. M. AIMAN, Feed Control.
C. E. BUCHANAN, Feed Control.

POULTRY HUSBANDRY—

W. A. LIPPINCOTT, in Charge.
F. E. FOX, General Investigations.
H. B. MUGGLESTONE, Superintendent of Poultry Plant.

VETERINARY MEDICINE—

R. R. DYKSTRA, in Charge.
C. W. HOBBS, Field Veterinarian.

ZOOLOGY—

R. K. NABOURS, in Charge.
J. E. ACKERT, Parasitology.
MARTHA DENNY, Genetics.
F. L. HISAW, Injurious Mammals.

BRANCH EXPERIMENT STATIONS.

FORT HAYS—

C. R. WEEKS, Superintendent.
A. L. HALLSTED, Dry-farming Investigations.¹
R. E. GETTY, Forage Crop Investigations.¹
A. H. KERNS, Assistant to Superintendent.
C. R. JACCARD, Forest Nurseryman.

1. In coöperation with the U. S. Department of Agriculture.

GARDEN CITY—

F. A. WAGNER, Superintendent.

F. E. KEATING, Dry-land Agriculture Investigations.¹

COLBY—

JOHN J. BAYLES, Superintendent.

ALBERT OSENBRUG, Dry-land Agriculture Investigations.¹

TRIBUNE—

IVAR MATTSON, Superintendent (till March 1, 1920).

G. E. LOWREY, Superintendent (since March 1, 1920).

1. In coöperation with the U. S. Department of Agriculture.

Engineering Experiment Station

OFFICERS OF THE STATION

W. M. JARDINE, President of the College.

ADMINISTRATION—

A. A. POTTER, Director.

LOUISE SCHWENSEN, Secretary.

APPLIED MECHANICS AND MACHINE DESIGN—

R. A. SEATON, in Charge.

W. B. WENDT, Strength of Materials.

C. E. PEARCE, Machine Design.

C. H. SCHOLER, Road Materials.

A. D. CONROW, Assistant in Road Materials.

L. V. WHITE, Assistant in Road Materials.

J. H. ROBERT, General Investigations.

ARCHITECTURE—

C. F. BAKER, in Charge.

J. D. WALTERS, General Investigations.

———, Rural Architecture.

STANLEY A. SMITH, General Investigations.

CHEMISTRY—

H. H. KING, in Charge.

P. J. NEWMAN, General Investigations.

CIVIL ENGINEERING—

L. E. CONRAD, in Charge.

F. F. FRAZIER, General Investigations.

M. W. FURR, Assistant.

L. V. WHITE, Assistant.

ELECTRICAL ENGINEERING—

C. E. REID, in Charge.

R. G. KLOEFFLER, General Investigations.

H. H. FENTON, General Investigations.

E. W. MARKLE, Assistant (till Feb. 29, 1920).

FARM ENGINEERING—

———, in Charge.

W. H. SANDERS, Tractors.

J. D. PARSONS, Farm Machinery.

PHYSICS—

J. O. HAMILTON, in Charge.

G. E. RABURN, General Investigations.

SHOP PRACTICE—

W. W. CARLSON, in Charge.

E. C. JONES, General Investigations.

G. A. SELLERS, Assistant.

STEAM AND GAS ENGINEERING—

J. P. CALDERWOOD, in Charge.

A. J. MACK, General Investigations.

L. S. HOBBS, Assistant.

History of the College

The Kansas State Agricultural College had its origin in the Bluemont Central College, an institution established at Manhattan under the control of the Methodist Episcopal Church of Kansas. The charter for this sectarian institution, approved February 9, 1858, provided for the establishment of a classical college, but contained the following interesting section:

"The said association shall have power and authority to establish, in addition to literary departments of arts and sciences, an agricultural department, with separate professors, to test soils, experiment in the raising of crops, the cultivation of trees, etc., upon a farm set apart for the purpose, so as to bring out to the utmost practical results the agricultural advantages of Kansas, especially the capabilities of the high prairie lands."

The corner-stone of the new College was laid on May 10, 1859, and instruction began about a year later. On March 1, 1861, a bill passed the legislature establishing a State University at Manhattan, the Bluemont Central College building to be donated for the purpose. This measure, however, was vetoed by Governor Robinson.

On July 2, 1862, President Lincoln signed the Morrill Act, "An act donating public lands to the several states and territories which may provide colleges for the benefit of agriculture and the mechanic arts." Section 1 of this act provides—

"That there be granted to the several states, for the purposes herein-after mentioned, an amount of public lands to be appropriated to each state a quantity equal to 30,000 acres for each senator and representative in Congress to which the states are respectively entitled by the apportionment under the census of 1860."

Section 4 requires that the money from the sale of these lands—

"Shall constitute a perpetual fund, the capital of which shall remain forever undiminished, and the interest of which shall be inviolably appropriated by each state which may take and claim the benefit of this act, to the endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

Because of the nature of the endowment made by Congress, the institutions founded in accordance with this act are generally known as the "land-grant" colleges. It may well be said that this was the most far-reaching and statesmanlike stroke of educational policy that any government has ever initiated.

On February 3, 1863, Governor Carney signed a joint resolution passed by the Kansas legislature, in accordance with which the pro-

visions of the Morrill Act "are hereby accepted by the State of Kansas; and the State hereby agrees and obligates itself to comply with all the provisions of said act." On February 16 of the same year the governor signed an act which permanently located the College at Manhattan, and provided—

"That the location of the said college is upon this express condition, that the Bluemont Central College Association . . . shall . . . cede to the State of Kansas, in fee simple, the real estate, . . . together with all buildings and appurtenances thereunto belonging; and shall . . . transfer and deliver to said State the apparatus and library belonging to said Bluemont Central College Association."

The three commissioners appointed by the governor selected 82,313.52 acres of the 90,000 granted by Congress. The deficiency of 7,686.48 acres was not made up by Congress till 1907.

After the passage of the creative act, no subsequent legislation was enacted by the Federal government with reference to the land-grant colleges until the second Morrill Act, for the further endowment of agricultural colleges, was passed. This bill received the signature of President Harrison on August 30, 1890. This act applied—

"A portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provisions of an act of Congress approved July second, eighteen hundred and sixty-two."

It provided—

"That there shall be and hereby is annually appropriated, out of any money in the treasury not otherwise appropriated, arising from the sales of public lands, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established or which may be hereafter established, in accordance with an act of Congress approved July 2, 1862, the sum of \$15,000 for the year ending June 30, 1890, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of \$1,000 over the preceding year, and the average amount to be paid thereafter to each state and territory shall be \$25,000, to be applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematics, physical, natural and economic science, with special reference to the industries of life, and to the facilities for such instruction."

The third and last act of Congress increasing the income of agricultural colleges is the Nelson amendment to the agricultural appropriation bill, which was approved March 4, 1907. In addition, however, to providing for an increase in the support of these institutions from Federal funds, the law contains the very significant provision specially authorizing the agricultural colleges to use a portion of this Federal appropriation for the special preparation of instructors for teaching agriculture and mechanic arts. The essential features of the Nelson amendment are embodied in the following quotations from the bill:

"That there shall be and hereby is annually appropriated out of any money in the treasury not otherwise appropriated, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of agricultural colleges now established, or

which may hereafter be established, in accordance with the act of Congress approved July 2, 1862, and the act of Congress approved August 30, 1890, the sum of \$5,000, in addition to the sums named in the said act, for the fiscal year ending June 30, 1908, and an annual increase of the amount of such appropriation thereafter for four years by an additional sum of \$5,000 over the preceding year, and the annual sum to be paid thereafter to each state and territory shall be \$50,000, to be applied only for the purposes of the agricultural colleges as defined and limited in the act of Congress approved July 2, 1862, and the act of Congress approved August 30, 1890; provided, that said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts."

THE DEVELOPMENT OF THE KANSAS AGRICULTURAL COLLEGE

The President and Faculty of the Bluemont Central College became the first board of instruction of the Kansas State Agricultural College, when the former institution was transferred to the State and assumed its present name. The Bluemont Central College was a small institution of the older American classical type, the curriculum resting upon Greek, Latin, and mathematics as the chief of fundamentals. Its transfer to the State, and its conversion into the State Agricultural College, involved at the time merely a change in name. The President and Faculty, and the curriculum remained unchanged. The second catalogue, that of 1864-'65, mentions an "agricultural" course, comprising one preparatory and two collegiate years; but, although this course was strengthened from time to time, the classical studies nevertheless remained until the year 1873, when the character of the institution was radically changed. Intensely practical courses replaced the then existing ones. The new scheme of instruction involved the abolition of the classical course, and the introduction of a practical scheme of industrial education, which comprised a farmer's course of six years, a mechanic's course covering four years, and a woman's course requiring six years. Strong opposition to the new educational policies was encountered, but the authorities of the institution adhered to them unswervingly, until the complete success of the new method silenced criticism. Thus the institution became in fact what it had hitherto been only in name—an agricultural college. In 1879 the Faculty consisted of the President, five professors, and six instructors of lesser rank, with a student body of 207. During this period of development the College was removed from the original Bluemont College site to its present campus, two miles nearer Manhattan.

From 1879 to 1897 no great changes were made in the courses of study, but the work was systematized and strengthened in many directions, retaining, however, the distinctive stamp of a college related to the industries. In 1897 the student enrollment was 734. The Faculty had grown in numbers, and the activities of the institution along investigative lines had been well begun through the organization of the Agricultural Experiment Station. Beginning with 1897, the greater stress was laid upon the study of financial, economic, and social problems. Several men of considerable note were added to the Faculty for the purpose

of strengthening these phases of educational work. In 1897 four professional courses, each four years in length, were organized—in agriculture, in mechanical engineering, in domestic science, and in general science. These years, therefore, mark the beginning of an era of broadening and diversification of the lines of instruction.

In 1899 the administration of the institution changed, and during the years that have followed the institution has experienced an era of solid, substantial, and uninterrupted growth, gaining steadily in recognition and in influence over the State. The number of professors and other instructors and the student enrollment grew steadily throughout this period up to the time of the outbreak of the war, when this College, along with all others, suffered heavily. Since 1899 additional buildings to the value of about \$500,000 have been erected on the campus.

The history of the Kansas State Agricultural College may well be divided into five epochs. The first ten years, from 1863 to 1873, may be called the classical period of the College. The succeeding period, from 1873 to 1879, was the formative stage, the years of the foundation of the Agricultural College properly so called, and bore the stamp of a spirit of pure industrialism of the most intensely "practical" type.

The next eighteen years, from 1879 to 1898, may be called the scientific culture period—a period in which, under modified ideals, the institution was sought to be used not so much as a tool to teach young men and women how to make a living as to teach them *how to live*, and strove to accomplish the end of character building by means of scientific and technical training having especial reference to agriculture.

Expansion of courses, with consequent increased flexibility, plasticity, and adaptability of the means of instruction to the various ends of industrial life, marked the following epoch of twelve years. In this period we see a rising tendency toward an increased acknowledgment of the Agricultural College as the guardian and custodian of the State's industrial interests, and a steady growth of settled confidence over the State in its ability to solve the State's industrial problems.

The present time, therefore, finds the College and its inseparable coadjutors, the Experiment Stations, occupying a position of far-reaching power and influence in connection with the most vital interests of the State of Kansas.

The Agricultural College accomplishes the objects of its endowment in several ways. It offers a substantial training in mathematics, in the fundamental sciences, in language, in history and civics, and in such other branches of human knowledge as experience has shown to be best adapted to give mental discipline, to develop good citizenship, and to furnish a proper equipment for entering upon active life. The combination of industrial training with the usual class and laboratory work has a special educational value. By the training of the hands the student is made more efficient in every way, is brought into contact with practical things, and is educated toward, rather than away from, an interest in industry and manual exertion. The general training which the College offers aims, therefore, at an equally efficient development of the physical and the mental powers. The greatest immediate aid to improvement in

social well-being and to betterment of the conditions of life is a thorough knowledge of science as applied to daily existence. In chemistry and physics, in geology, in botany, in bacteriology, in entomology, in mechanics, the student is brought to an understanding of the relation of man to the world around him, and to a knowledge of how to utilize natural forces for the protection and improvement of his own life.

The College trains directly toward the productive occupations in a considerable number of specialized branches. For example: In agriculture, the student may specialize in agronomy, horticulture, forestry, animal husbandry, dairying, poultry husbandry, or veterinary science. In engineering, the student may take work in mechanical, electrical, or civil engineering, architecture, or any of the various special courses for mechanics. For young women, training is offered in household economics, nutrition, food economics, clothing and textiles, home furnishing, home decoration, etc.

A second large object of the College, made effective through the Experiment Stations, is to investigate the problems of agriculture and the industries. By conducting the researches of the Experiment Stations in close connection with the educational work of the College opportunity is afforded students to gain an understanding and an appreciation of the work of scientific investigation, and to become better able to appreciate the relation of science to agriculture. Opportunity is thus also offered to obtain such training as will fit competent students to become investigators, and to enter fields of agricultural leadership in the experiment stations, in the United States Department of Agriculture, as heads of private agricultural enterprises, or in the capacity of superintendents and managers of such undertakings.

In addition to the regular educational work, the College now maintains, through the Division of College Extension, a highly organized system of agricultural education among the farmers themselves. A corps of trained and efficient institute lecturers hold meetings in every county in the State, conduct seed trains, dairy trains, corn trains, alfalfa trains, and poultry trains, and publish two series of pamphlets of information and instruction—one for rural teachers, the other for members of farmers' institutes. In addition to the regular staff of the Division of College Extension, many members of the College Board of Instruction, and of the staff of the Experiment Station, give several weeks of each year to the public work of the farmers' institutes.

Finally, the College and the Station together are being increasingly charged by the State government with State industrial and police duties, such as pure-food investigations, control of feeding stuffs and fertilizers, State forestry work, and other similar duties.

The Agricultural Experiment Station

The Kansas Agricultural Experiment Station was organized under the provisions of an act of Congress, approved March 2, 1887, which is commonly known as the "Hatch Act," and is officially designated as—

"An act to establish agricultural experiment stations in connection with the colleges established in the several states under the provisions of an act approved July 2, 1862, and the acts supplementary thereto."

The wide scope and far-reaching purposes of this act are best comprehended by an extract from the body of the measure itself, in which the objects of its enactment are stated as being—

"To aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and practice of agricultural science."

The law specifies in detail—

"That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and waters; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses for forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable."

On the day after the Hatch Act had received the signature of the President, the legislature of Kansas, being then in session, passed a resolution, dated March 3, 1887, accepting the conditions of the measure, and vesting the responsibility for carrying out its provisions in the Board of Regents of the Kansas State Agricultural College.

Until 1908 the expenses of the Experiment Station were provided for entirely by the Federal government. The original creative act (the Hatch Act) carried an annual congressional appropriation of \$15,000. No further addition to this amount was made until the passage of the Adams Act, which was approved by the President March 16, 1906. This measure provided, "for the more complete endowment and maintenance of agricultural experiment stations," a sum beginning with \$5,000, and increasing each year by \$2,000 over the preceding year for five years, after which time the annual appropriation was to be \$15,000—

"To be applied to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States, having due regard to the varying conditions and needs of the respective states or territories."

It is further provided that—

"No portion of said moneys exceeding five percentum of each annual appropriation shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings, or to the purchase or rental of land."

The Adams Act, providing as it does for original investigations, supplied the greatest need of the Experiment Station—means of providing men and equipment for advanced research. Only such experiments may be entered upon, under the provisions of this act, as have first been passed upon and approved by the Office of Experiment Stations of the United States Department of Agriculture.

In the neighborhood of sixty projects, covering practically all phases of agricultural investigation, are being studied by the members of the Experiment Station staff.

The farms, live stock, laboratories, and general equipment of the College are all directly available for the use of the Experiment Station.

The results of the work of the Experiment Station are published in the form of bulletins, circulars, and scientific papers other than bulletins and circulars. These bulletins are of two classes—those which record the results of research work of a purely scientific character and those which present technical information in a simplified form, suitable for the general reader. The circulars are brief and condensed popular presentations of data which call for immediate application, as well as timely and useful information not necessarily new or original. The scientific papers are usually published as reprints or addresses given before scientific bodies. These reprints contain original information or report definite steps in the progress of investigations under way.

All bulletins and other publications from the Experiment Station are sent without charge to citizens of the State. Any person in the State who so desires may have his name placed on the permanent mailing list of the Station.

Letters of inquiry and general correspondence should be addressed: "Agricultural Experiment Station, Manhattan, Kan." Special inquiries should be directed, so far as possible, to the heads of departments having in charge the matters concerning which information is desired.

CONTROL WORK OF THE STATION

In addition to the work of agricultural investigation, the State has enlarged the activities of the Station along various lines of State executive or control work.

One of the important lines of control work is that of State dairy commissioner. This official, appointed by the Board of Administration, and having his office at the seat of the Agricultural College, is required (Laws of 1909, ch. 237)—

"To inspect or cause to be inspected all the creameries, public dairies,

butter, cheese and ice-cream factories, or any place where milk or cream or their products are handled or stored within the State, at least once a year, or oftener if possible."

He may in connection with the Board of Administration of the College—

"Formulate and prescribe such reasonable rules and regulations for the operation of creameries, butter, cheese and ice-cream factories and public dairies as shall be deemed necessary by such board to fully carry out the provisions of this act."

He may act on complaints regarding the sale of unwholesome or unclean dairy products, and may prohibit their sale. He may—

"Condemn for food purposes all unclean or unwholesome milk, cream, butter, cheese or ice cream, wherever he may find them."

Another important State function is that of the State Entomological Commission. (Laws of 1907, ch. 386; 1909, ch. 27.) This commission, created in 1907, was established—

"To suppress and eradicate San José scale and other dangerous insect pests and plant diseases throughout the State of Kansas."

The professors of entomology at the Agricultural College and at the University of Kansas are by law designated as two of the five members of the above commission. Acting under the title of State entomologist, they divide between them the territory of the State, for the purpose of inspection.

They are empowered—

"To enter upon any public premises . . . or upon any land of any firm, corporation or private individual within the State of Kansas, for the purpose of inspection, destroying, treating, or experiment upon the insects or diseases aforesaid."

They may treat or cause to be treated "any and all suspicious trees, vines, shrubs, plants, and grains," or, under certain conditions, may destroy them. They must annually inspect all nursery stock, and no nursery stock is to be admitted within the State without such inspection.

Concerned with the live-stock interests of the State is the State Live Stock Registry Board, with regard to which there is the following provision (Laws of 1913):

"Every person, persons, firm, corporation, company or association that shall stand, travel, advertise or offer for public service in any manner any stallion in the State of Kansas, shall secure a license certificate for such stallion from the Kansas State Live Stock Registry Board, as herein provided. Said board shall consist of the dean of the Division of Agriculture, head of the Animal Husbandry Department, and the head of the Veterinary Department of the Kansas State Agricultural College."

To this board is assigned the duty of licensing stallions used for breeding purposes within the State, and authority to verify their breeding and to classify them under the following heads: Pure bred, grade, crossbred, and scrub. No animal not thus approved and licensed with the board is permitted to be used for public breeding purposes.

By legislative act (Laws of 1909, ch. 49), a "division of forestry" at the Agricultural College is also provided for in the following terms:

"For the promotion of forestry in Kansas there shall be established at the Kansas State Agricultural College, under the direction of the Board of Regents, a division of forestry. The Board of Regents of the Kansas State Agricultural College shall appoint a State forester, who shall have general supervision of all experimental and demonstration work in forestry conducted by the Experiment Station. He shall promote practical forestry in every possible way, compile and disseminate information relative to forestry, and publish the results of such work through bulletins, press notices, and in such other ways as may be most practicable to reach the public, and by lecturing before farmers' institutes, associations, and other organizations interested in forestry."

The State has also placed the Experiment Station in charge of the execution of the acts concerning the manufacture and sale of live-stock remedies and commercial feeding stuffs (Laws of 1913), and also of commercial fertilizers (Laws of 1907, chapter 217). It is provided by the statutes that every brand of live-stock remedy and every brand of commercial feeding stuffs offered or held for sale or sold within the State of Kansas shall be registered in the office of the Director of the Agricultural Experiment Station of the Kansas State Agricultural College, and each sale of any such brand not so registered shall constitute a separate violation of this act.

And—

"Except as herein provided, it shall be unlawful within the State of Kansas to sell, offer for sale, or expose for sale any commercial fertilizer which has not been officially registered by the Director of the Agricultural Experiment Station of the Kansas State Agricultural College."

These general provisions are limited in their application by important exceptions stated in the laws. The fees collected under these acts are used to defray the necessary expenses incurred in carrying out the provisions of the acts.

It will thus be seen that the State of Kansas is making increasing use of the scientific staff of the Experiment Station in matters of State importance requiring the application of technical knowledge.

Branch Agricultural Experiment Stations

FORT HAYS BRANCH STATION

The land occupied by this Station is a part of what was originally the Fort Hays military reservation. Being no longer required for military purposes, it was turned over to the Department of the Interior, October 22, 1899, for disposal under the act of Congress of July 5, 1884. Before final disposition of this land was made, however, the Kansas legislature, in February, 1895, passed a resolution requesting the Congress of the United States to donate the entire reservation of 7,200 acres to the State of Kansas for the purposes of agricultural education and research, for the training of teachers, and for the establishment of a public park. Bills giving effect to this request were introduced into Congress without avail, until the fifty-sixth Congress when, through the influence of Senator, later Regent, W. A. Harris, and of Congressman Reeder, a bill was passed, setting aside this reservation "for the purpose of establishing an experimental station of the Kansas Agricultural College and a western branch of the Kansas State Normal School thereon and a public park." This bill was approved by the President on March 28, 1900. By act of the State legislature, approved on February 7, 1901, the act of Congress donating this land and imposing the burden of the support of these institutions was accepted. The same session of the legislature passed an act providing for the organization of a branch experiment station and appropriating a small fund for preliminary work. In the division of this land, the College received 3,560 acres.

The land at the Fort Hays Branch Station consists mainly of high, rolling prairie, with a limited area of rich alluvium bordering on a creek, and is situated on the edge of the semi-arid plains region. It is well suited for experimental and demonstration work in dry farming, in irrigation, and in crop, forestry, and orchard tests, under conditions of limited rainfall and high evaporation.

The work of this Station may be divided into two divisions: (A) experimental projects, (B) general farm and live-stock work. The experimental projects are as follows: Dry-farming investigations, forage-crop investigations, cereal-crop investigations, forest, nursery and park demonstrations and investigations, farm dairying, and experiments in the feeding and breeding of live stock. All this work is confined to the study of the problems peculiar to the western half of the State, and relates especially to crop production under limited rainfall, to the development of varieties better adapted to the climatic conditions there prevailing, and to studies of the systems of animal husbandry and dairy husbandry suited to this region. The facilities of this Station are being used for the growing of large quantities of pure seed of the strains and varieties which have proved in actual test to be most productive in the western part of the State.

GARDEN CITY BRANCH STATION

In 1906 the county commissioners of Finney county purchased, for purposes of agricultural experimentation, a tract of land amounting to 320 acres, situated four and one-half miles from Garden City, on the unirrigated upland.

The land has been leased for a term of ninety-nine years to the Kansas Agricultural Experiment Station as an "experimental and demonstration farm," for the purpose of determining the methods of culture, crop varieties, and crop rotations best suited to the southwestern portion of the State, under dry-land farming conditions. A pumping plant irrigating from eighty to one hundred acres has been installed for the purpose of investigating the expenses of pumping and the cost of equipment necessary for plants of this type, which are common in the shallow-water districts between Garden City and Scott City and along the Arkansas Valley. The Experiment Station's investigations in irrigation agriculture are centered at this branch station.

COLBY BRANCH STATION

The legislature of 1913 provided for the establishment of a branch experiment and demonstration station near Colby, in northwestern Kansas, "for the purpose of advancing and developing the agricultural, horticultural, and irrigation interests of this State and western Kansas." The Station was located upon a tract of three hundred and fourteen acres of land bordering upon the town site of Colby. This land was purchased by the county and deeded to the State for the purposes named above. Operations were begun in March, 1914. Cropping experiments are being conducted under dry-land conditions and under irrigation. Water is being lifted one hundred and fifty feet for irrigating a garden, fruit trees, and a few desirable crops, such as alfalfa, that could not be grown successfully in western Kansas with the natural rainfall. The primary purpose of the Colby Station is to determine the best methods of developing the agriculture of northwestern Kansas and to make it a still more desirable place to live.

TRIBUNE BRANCH STATION

At the Tribune Station experimental and demonstration work is conducted for the benefit of the surrounding territory. Special attention is paid to the problems of producing, storing, and utilizing crops for winter feeding of cattle which in summer graze the extensive range areas of the extreme western part of the State.

The Engineering Experiment Station

The Engineering Experiment Station was established for the purpose of carrying on tests and research work of engineering and manufacturing value to the State of Kansas, and of collecting, preparing, and presenting technical information in a form readily available for the use of the various industries within the State. It is the intention to make all the work of the Experiment Station of direct importance to Kansas.

All of the equipment of the various engineering and scientific laboratories and shops and of the College power plant are available for this work, while the personnel of the Station staff is made up of professors and instructors from the various departments of the Division of Engineering and from other scientific departments whose work is directly related to the work of this division.

Among the tests now being carried on are investigations on the strength of concrete, the road-making properties of various Kansas stones, gravels, and sands, the relative costs of concrete of a given quality when made with and without coarse aggregates, bituminous sand cushions for brick roads, power-plant economics, the use of the windmill for driving electric generators for farm lighting, the losses in electric transmission lines, and in town and city distribution systems, the mechanical and electrical properties of commercial copper wire used in pole-line construction, the economy of electric cooking and heating devices, and the effect of chemical composition on the durability and protective power of paints.

Various other investigations are being carried on upon brick, concrete, fuels, lubricating oils, pipe coverings, insulation for refrigeration, belt lacings, glued joints, blacksmith coals, foundry sands, centrifugal pumps, and problems in farm architecture.

A continuous record is being made of the stage of the Kansas river at Manhattan, to be used in computing the flood discharge of that stream, as a basis for designing works for flood protection.

The testing laboratories of this Station have been designated by law* as the testing laboratories for the State Highway Commission and the State Highway Engineer, and as such have charge of the testing of all road materials for use in Federal-aid road construction in this State.

The results of the investigations are published as bulletins and circulars of the Engineering Experiment Station, which are sent free to any citizen of the State upon request. Besides issuing these bulletins, the Station answers yearly many hundreds of requests for information upon matters coming within its field.

Requests for bulletins and general correspondence should be addressed to Engineering Experiment Station, Manhattan, Kan. Requests for information in specific matters should be addressed, so far as it is possible, to the heads of departments in whose fields the particular matters lie.

* Sec. 5, ch. 64, Laws of 1917.

Grounds, Buildings, and Equipment

The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric-car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses, and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens, and experimental fields. Broad, well-shaped macadamized avenues lead to all parts of the grounds. Cement walks connect the buildings with one another and with the entrances. Including the campus of 160 acres, the College owns 1,136 acres of land at Manhattan, valued at \$340,600. Outside the campus proper, all of the land is devoted to educational and experimental work in agriculture. Within the College grounds, most of the space not occupied by buildings and needed for drives and ornamental plantings is devoted to orchards, forest and fruit nurseries, vineyards, and gardens. A number of fields in the northern and western portions of the campus are used for general experimental work by various departments.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of limestone obtained from the College quarries. These buildings are listed below.

ANDERSON HALL. Erected, 1879; cost, \$79,000; dimensions, 152 x 250 feet; two stories and basement. Contains the offices of administration of the College, a social center hall, the College post office, offices of the Division of College Extension and of the Department of Student Health, and offices and classrooms of the Departments of Architecture, Economics, Education, English, Applied Art, and Mathematics. Value of equipment, \$29,049.*

AUDITORIUM. Erected, 1904; cost, \$40,000; dimensions, 113 x 125 feet. Has a large stage with drop curtain and scenery. Seating capacity, 2,300. Contains also the offices and music rooms of the Department of Music. Value of equipment, \$5,414.

CHEMISTRY ANNEX. Erected, 1876; cost, \$8,000; dimensions, 35 x 110 and 46 x 175 feet, in the form of a cross. Originally erected as a chemical laboratory. Reconstructed at a cost of \$5,000 after a fire in 1900, the building was used from 1902 to 1911 as a women's gymnasium; since 1911, used by the Department of Chemistry. Value of equipment, \$14,147.

DAIRY COMMISSION HALL. Erected, 1888; cost, \$5,000; dimensions, 30 x 30 feet; one story and basement. Used for many years by the Department of Horticulture and Entomology, then for horticultural work when that was made a separate department. Contains offices occupied by the State dairy commissioner. Value of equipment, \$1,040.

* The figures for equipment are taken from the reports of June 30, 1919.

DAIRY HALL. Erected, 1904; cost, \$15,000; dimensions, 72 x 103 feet, one story and basement. Contains butter-manufacturing rooms, hand-separator room, laboratory, classroom, three offices, and two refrigerating rooms. Occupied entirely by the Department of Dairy Husbandry. Value of equipment, \$7,456.

DENISON HALL. Erected, 1902; cost, \$70,000; dimensions, 96 x 166 feet; two stories and basement. The east wing is occupied throughout by the laboratories, classrooms and offices of the Department of Chemistry. The west wing is occupied by the Department of Electrical Engineering and by the Department of Physics. Value of equipment: Chemistry, \$36,264; Electrical Engineering, \$29,980; Executive, \$947; Physics, \$13,553.

ENGINEERING HALL. The main portion of this building is now under construction at a cost of \$190,000. The east wing, erected in 1909, cost \$80,000. Dimensions of part now under construction, 60 x 236 feet; three and four stories in height, fireproof construction throughout. Dimensions of part previously erected, 113 x 200 feet; three stories in height, but much of it built on the gallery plan rather than by complete floor separation into different stories. This building will contain, when completed, the general offices and library of the Division of Engineering, and the offices, drafting rooms and laboratories of the Departments of Applied Mechanics, Architecture, Civil Engineering, Electrical Engineering, and Steam and Gas Engineering. The engines, turbines, generators and boilers that furnish power and light for the College are also installed in this building. Value of equipment, \$56,804.

ENGINEERING SHOPS. These consist of several connected structures, erected at different times. The original building, now used as the wood-working shop, was erected in 1876; a series of additions having later been successively made, the present group is the result. The cost of the whole amounts to \$35,000. A portion of the building is two stories high. On the upper floor, which has a floor area of 9,260 square feet, are classrooms, drafting rooms, pattern storage room, and offices of the Department of Applied Mechanics and Machine Design, and Shop Practice. The woodworking shop (35 x 219 feet) is equipped with the necessary bench tools and woodworking machinery. Adjoining is the machine shop (40 x 170 feet), supplied with benches and tools and amply equipped with the necessary machine tools. The blacksmith shop (50 x 100 feet) contains 35 forges of modern type, connected with power blast and down-draft exhaust. Adjoining is the lecture hall, with demonstration forge and equipment. The iron foundry (27 x 100 feet) and brass foundry (24 x 34 feet) are well supplied with the necessary equipment. The wash and locker room (36 x 40 feet) contains 250 steel lockers. A general-supply room (22 x 24 feet) is conveniently located for storing the necessary small supplies. Value of equipment, \$47,671.

FAIRCHILD HALL. Erected, 1894; cost, \$67,750; dimensions, 100 x 140 feet; two stories, basement, and attic. On the first floor are the College Library and reading rooms, a newspaper reading room, offices of the Librarian and his assistants, and the general museum. On the second floor are the offices, classrooms and laboratories of the Departments of

Zoölogy, Entomology, and of History and Civics. The museums of natural history are placed here also. The basement is occupied largely by recitation rooms and offices of the Department of History and Civics. Value of equipment: Entomology, \$14,350; Executive, \$685; History and Civics, \$831; Library, \$146,567; Zoölogy, \$17,986.

FARM BARN. Erected, 1913; cost, \$25,000; dimensions, 80 x 160 feet; two stories and basement. Consists of three sections, arranged like the letter H, and a glazed tile silo of 200 tons capacity. The west wing contains nine box stalls and twenty-six single stalls, equipped with sanitary feed mangers and racks, and is designed especially for the housing of horses. The east wing contains twelve box stalls and thirty single stalls for the breeding cattle and the show herd. The central section has an office, feed rooms, a washing floor, and a basement containing the engine room. The loft, to which a driveway leads, has storage space for ten carloads of grain and 100 tons of hay and straw and contains the grinding apparatus. This barn is used by the Department of Animal Husbandry.

FARM MACHINERY HALL. Erected, 1870; cost, \$11,250; dimensions, 46 x 95 feet; two stories. The first building erected on the present campus. Originally designed as a College barn, and first used for that purpose. Later used as a general College building, then by the Department of Botany, and afterwards by the Department of Veterinary Medicine. The first floor, a large hall, was used by the Department of Military Science for many years as an armory. The entire building has been given over for the use of the Department of Farm Engineering, and is filled with all types of farm machinery. Value of equipment: Executive, \$210; Farm Engineering, \$2,542.

HOME ECONOMICS HALL. Erected, 1908; cost, \$70,000; dimensions, 92 x 175 feet; two stories and basement. The first floor and basement are occupied by the laboratories, classrooms, and offices of the Departments of Food Economics and Nutrition, and Household Economics; the second floor is occupied by the laboratories, classrooms, and offices of the Department of Clothing and Textiles. Value of equipment: Clothing and Textiles, \$6,462; Dean's offices, \$872; Executive, \$440; Food Economics and Nutrition, \$9,974; Household Economics, \$2,878.

HORTICULTURAL BARN. Erected, 1917; cost, \$1,500; dimensions, 38 x 55 feet. Two stories, first story stone, second story frame. This building is located one mile west of the College campus.

HORTICULTURAL HALL. Erected, 1907; cost, \$50,000; dimensions, 72 x 116 feet. This building, one of the best and most commodious on the campus, is now used by the Departments of Botany and Horticulture. Its classrooms, laboratories, museums, and equipment are modern and ample. Value of equipment: Botany, \$17,375; Executive, \$551; Horticulture, \$11,633.

ILLUSTRATIONS HALL. Erected, 1877; cost, \$4,000; dimensions, 32 x 80 feet; one story and basement. At an early period used as a horticultural hall; later the headquarters for general College repairs; since the summer of 1919 used by the Department of Illustrations. Value of equipment (Jan. 1, 1920), \$1,200.

INFIRMARY. Erected, previous to 1884; rebuilt, 1919; dimensions, 34 x 34 feet; two stories. Originally a farm house, later used as dwelling by the Professor of Agriculture and more recently by the Custodian. Contains separate wards for men and women, five rooms in each ward.

KEDZIE HALL. Erected, 1897; cost, \$16,000; dimensions, 70 x 84 feet; two stories and basement. Used from its erection till 1908 by the Departments of Domestic Science and Domestic Art. Basement occupied by the printing plant; first floor taken up by the cafeteria since the summer of 1915, and by offices of the Department of English; second floor divided into general classrooms and offices used by the Departments of Industrial Journalism and Printing, and English. Value of equipment: Cafeteria, \$7,264; English, \$1,000; Executive, \$254; Industrial Journalism and Printing, \$6,270.

NICHOLS GYMNASIUM. Erected, 1911; cost, \$122,000; dimensions, 102 x 221 feet; three stories and basement. The building consists of a main section and two wings. The main section (85 x 141 feet), consisting of two stories and a basement, is used as a men's gymnasium and armory, and contains a running track, sixteen laps to the mile. The east half of the basement of the main section contains a swimming pool, baths, rest room, etc., for women; the west half contains a swimming pool and baths for men. The east wing (40 x 102 feet) contains the women's gymnasium, classrooms and offices of the Department of Military Training, and several literary society halls. The west wing (40 x 102 feet) contains the offices of the Director of Athletics and Physical Education, a large locker room for men, classrooms and offices of the Department of Modern Languages, and several literary society halls. This building is constructed on the old armory-castle type and is modern in every respect. Value of equipment, \$7,102.

SCHOOL OF AGRICULTURE HALL. Erected, 1900; cost, \$25,000; dimensions, 90 x 95 feet; two stories and basement. Occupies the original site of the President's house, destroyed by lightning in 1896. Contains classrooms and offices of the School of Agriculture and of the Department of Public Speaking. Value of equipment, \$2,835.

VETERINARY HALL. Erected, 1908; cost, \$70,000; dimensions, 133 x 155 feet; two stories and basement. Occupied by the laboratories, demonstration and dissecting rooms, classrooms, and offices of the Department of Anatomy and Physiology, Bacteriology, Pathology, and Vaccine Laboratories, and by the offices of the Dean of the Division of Veterinary Medicine. Value of equipment, \$29,004.

WATERS HALL. Erected 1912; cost of portions now completed, \$125,000; cost of building when developed and completed as planned, \$500,000. The completed building will consist of a central portion (130 x 80 feet), with basement and three stories; of two wings (each 80 x 169 feet), with basement and three stories, and with a sub-basement under half of the east wing; and of a stock-judging pavilion placed back of the central portion and between the wings. This pavilion is now completed, and contains tie and box stalls and two large stock-judging rooms (45 x 100 feet), each having a seating capacity of 475. Each of these

rooms may be divided into two, with a passage between, by the use of curtains. The east wing of the building is used by the Departments of Agricultural Economics, Agronomy, Animal Husbandry, Milling Industry, and Poultry Husbandry. This wing contains, besides offices and recitation rooms of these departments and the general offices of the Agricultural Experiment Station and of the Dean of the Division, a complete small flour mill, and laboratories for grain judging. Value of equipment: Agricultural Economics, \$1,116; Agricultural Experiment Station, \$1,362; Agronomy, \$15,300; Animal Husbandry, \$4,582; Dean's offices, \$2,054; Executive, \$956; Milling Industry, \$14,998; and Poultry Husbandry, \$584.

In addition to the substantial stone buildings mentioned above the College has a number of other buildings, among them the following:

EXPERIMENT STATION BUILDING. Erected, 1918; dimensions, 40 x 176 feet; two stories. Built as barracks No. 4 for the S. A. T. C., now used by the Agricultural Experiment Station.

GENERAL PURPOSE BUILDING. Erected, 1918; dimensions, 40 x 80 feet; two stories. Built as barracks No. 6 for the S. A. T. C. The east half of the first floor is used by the Department of Music; the west half of the second floor is used by the Department of Electrical Engineering; and the east half of the second floor is used for the storage of auto parts.

GREENHOUSES. Erected, 1909; cost, \$7,000; dimensions, 114 x 150 feet. Contains six sections used by various departments as follows: Horticulture, three; Botany, one; Agronomy, one; Entomology and Zoölogy, one. Value of equipment, \$4,196.

MESS HALL. Erected, 1918; dimensions, 42 x 176 feet; two stories. Built for the S. A. T. C. as mess hall and still used for that purpose.

PLANT MUSEUM. Erected, 1907; cost, \$2,500; dimensions, 20 x 100 feet. Used by the Department of Horticulture. Contains a large number of rare growing plants, including many subtropical species. Value of equipment, \$600.

REPAIR SHOP. Erected, 1918; dimensions, 40 x 176 feet; one story. Built as barracks No. 1 for the S. A. T. C. Value of equipment, \$1,756.

SERUM BARN. Erected, 1914; cost, \$3,000; dimensions, 92 x 96 feet; contains 30 pens, each 8 x 12 feet, and two feed rooms of the same dimensions. This is a frame and cement building situated three-quarters of a mile north of the College campus.

SERUM PLANT. Erected, 1914; cost, \$7,000; constructed of brick; dimensions, 20 x 60 feet; two stories. Value of equipment, \$8,693.

TRACTION ENGINE LABORATORIES. Erected, 1918; cost, \$20,000; two buildings, each 40 x 176 feet. These are two frame buildings on concrete foundations, built originally as barracks Nos. 2 and 3 for the S. A. T. C.

POWER AND WATER SYSTEMS. The College maintains and operates its own modern heat, light, power, water and sewer systems. A central boiler plant of 2,400 horse power furnishes steam for both the heating system and the power plant. The central power plant contains steam

engines and turbines, totaling 700 horse power, connected to electric generators which furnish power and light for the entire campus. A complete system of underground tunnels connects the various buildings and through these are carried the steam mains and electric cables which distribute steam and electrical energy to the different parts of the campus.

The water works pump house contains electric motor-driven pumps of an aggregate capacity of 600 gallons per minute. Cast-iron water mains distribute this over the campus, and a steel tank of 110,000 gallons capacity supported on a steel tower provides a reserve supply.

Value of the equipment in connection with the power and water systems amounts to \$127,470. In addition to this and other totals for equipment listed above, there are other items which might be mentioned, *e. g.* live stock valued at \$160,320.

The College Library

The general College Library consists of all books belonging to the College, including the library of the Experiment Station, which is incorporated with it. On January 1, 1920, the Library contained 65,774 bound volumes, besides much unbound material. It receives currently about four hundred serial publications. As a depository the Library receives the documents and other publications of the United States government. The books are classified according to the Dewey system and are indexed in a dictionary card catalogue.

All students, as well as all officers of administration and instruction, have the privilege of direct access to the book stacks. The Library is primarily for free reference use, but the privilege of drawing books is accorded to all those connected with the College as registered students or as members of the Faculty. Books not specially reserved may be drawn for home use for two weeks. All books are subject to recall at any time.

General reference books, books reserved for classes, general periodicals, and certain other groups of books are to be consulted only in the reading rooms. They may not be loaned from the Library except when the reading rooms are closed. They must then be returned to the Library by the time it next reopens. Any violation of the regulations of the Library subjects the offender to a fine, or to a withdrawal of library privileges, or to both, according to the gravity of the offense. More serious offenses, such as mutilation or theft of books or periodicals, are considered just causes for suspension or expulsion of the offender, who is also required to make good the loss incurred.

READING ROOMS. Three reading rooms are maintained in connection with the Library; the general reference room, containing encyclopedias, dictionaries, atlases, bibliographies, and general reference books; the special reference room, containing books reserved for classes; and the periodical room, containing current magazines and the important daily and weekly Kansas newspapers. These rooms are freely open to the students and to the public for purposes of reading and study.

DIVISIONAL LIBRARIES. Divisional and departmental collections are deposited in certain College buildings apart from the main Library. These collections are for the special convenience of the instructors and students of the departments concerned. They are under the direction of the Librarian and are accessible to all students at regular hours.

Requirements for Admission

The entrance requirements to the College are made broad and flexible, only fundamental subjects being definitely required. These requirements are made upon the supposition that high schools are local institutions in which the courses should be adapted to the needs of the individual localities, and that college entrance requirements should be such as to take the output of the high schools, rather than to determine the nature of the work offered in them.

Any person who has completed a four-year course of study in any high school or academy accredited by the State Board of Education will be admitted to the freshman class.

Persons who are not graduates of accredited high schools or academies will be admitted to the freshman class if they have completed fifteen acceptable units of high-school work. (A unit is defined to be the work in an accredited high school or academy in five recitation periods a week for one school year.) One who offers fourteen such units will be admitted as a freshman, but will be conditioned in one unit. Such deficiency must be made up the first year that the student is in attendance. If not made up within that time College credits are taken in its place.

In order to enter upon the several curricula without loss of time the following subjects must have been completed:

| | |
|---|--|
| Curriculum in Agriculture | English, three units; physics, one unit; algebra, one unit; geometry, one unit |
| Curriculum in Veterinary Medicine... | Same as above |
| Curriculum in Animal Husbandry and Veterinary Medicine | Same as above |
| Curriculum in Industrial Journalism.. | Same as above |
| Curriculum in Home Economics..... | Same as above |
| Curriculum in General Science..... | English, three units; physics, one unit; algebra, one and one-half units; geometry, one unit |
| Curricula in Agricultural Chemistry, Industrial Chemistry, and Biochemistry | Same as above |
| Curricula in Engineering | English, three units; physics, one unit; algebra, one and one-half units; geometry, one and one-half units |
| Curriculum in Architecture | Same as above |

Subjects acceptable for entrance, arranged in eight groups, together with the number of units that may be offered, are shown as follows:

| | |
|---------|---------------------|
| GROUP I | |
| English | Three or four units |

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|---|--|
| GROUP II Foreign Languages | Latin, one, two, three, or four units Greek, one, two, three, or four units German, one, two, three, or four units French, one, two, three, or four units Spanish, one, two, three, or four units |
| GROUP III Mathematics | Elementary algebra, one or one and one-half units Plane geometry, one unit Solid geometry, one-half unit Plane trigonometry, one-half unit Advanced algebra, one-half unit |
| GROUP IV Natural Sciences | Physical geography, one-half or one unit *Physics, one unit *Chemistry, one unit *Botany, one-half or one unit *Zoölogy, one-half or one unit *Physiology, one-half or one unit *General biology, one-half or one unit *General science, one-half or one unit |
| GROUP V History and Social Sciences | Greek and Roman history, one unit Medieval and modern history, one unit English history, one unit American history, one unit Economics, one-half or one unit Sociology, one-half unit Civics, one-half or one unit |
| GROUP VI Normal Train- ing Subjects | Psychology, one-half unit Methods and management, one-half unit Higher arithmetic, one-half unit Reviews Grammar, twelve weeks Geography, twelve weeks Reading, twelve weeks *Music, one unit |
| GROUP VII Industrial Subjects | *Agriculture, one-half, one, two, three, or four units *Drawing, one-half or one unit *Woodwork, one-half, one, or two units *Forging, one-half or one unit *Domestic science, one-half, one, or two units *Domestic art, one-half, one, or two units |
| GROUP VIII Commercial Subjects | Commercial law, one-half unit Commercial geography, one-half unit Bookkeeping, one-half or one unit *Stenography and typewriting, one-half or one unit |

DEFICIENCIES

The courses in the School of Agriculture offered in connection with the College give every needed opportunity for students of the College to make up anything lacking in their preparation for entrance. All such entrance deficiencies must be made up before the beginning of the sophomore year. No student is considered a candidate for graduation in the spring who is deficient more than nine semester hours in addition to his regular assignment at the beginning of the first semester. No student who fails or is conditioned or found deficient in any subject, or whose grade in more than one subject falls below G in any semester, is allowed to carry extra work during the succeeding semester.

* In courses consisting of laboratory work wholly or in part, two periods of laboratory work are to be considered the equivalent of one recitation period.

ADVANCED CREDIT

At the discretion of the President, students who present certificates showing credits for college work done in other institutions are allowed hour-for-hour credit on courses in this College in so far as they may be directly applied, or can be accepted as substitutions or electives. Candidates must present to the Committee on Advanced Standing their high-school and college credits certified to by the proper authorities. It is requested, also, that a college catalogue covering the period of attendance be furnished with the above credentials. In cases in which it is impossible for one to furnish an acceptable certificate concerning work upon which advanced credit is asked, examinations are given, if the subject has been studied under competent instruction.

ADMISSION

ADMISSION BY EXAMINATION. Examinations for admission will be held at the College on Monday, September 13, 1920; Tuesday, February 1, 1921; and Friday, June 3, 1921.

ADMISSION BY CERTIFICATE. The applicant is required to submit to the Committee on Admission a certificate of the high-school or academy credit properly certified to by the authorities of the institution in which the work was done. Blanks will be furnished by the College for this purpose.

It is greatly to the advantage of the prospective student to see to it that this blank, properly filled out and *indicating the course he wishes to take here*, be sent to the College as soon as possible after graduation. A permit to register will then be sent him by the Registrar before the first of September. This permit *cannot be sent* unless the prospective student sees that the information as to course is sent to the Registrar. This will greatly facilitate the work of entrance. The student will present this permit at the registration room in Nichols Gymnasium, and will not be compelled to wait for his turn to meet the Committee on Admission.

LATE REGISTRATION

A considerable amount of extra work and a great deal of confusion is caused by the neglect of students to enroll at the time set for that purpose, and a fee of \$1 will be charged those who enroll after the time fixed for the close of registration unless they present a good excuse for their delay.

SPECIAL STUDENTS

In recognition of the fact that experience and maturity tend to compensate, in a measure at least, for lack of scholastic attainment, the College admits as special students those who are twenty-one years of age or older, without requiring them to pass the regular examinations, provided (1) they show good reason for not taking a regular course; (2) they be assigned only to such work as they are qualified to carry successfully; (3) they do superior work in the subjects assigned. The age limit is not applied to special students of music.

A special student is assigned by the dean of the division in which occur the major subjects to be pursued.

KANSAS HIGH SCHOOLS AND ACADEMIES IN ACCREDITED RELATIONS WITH THE COLLEGE

(Graduates admitted without examination.)

| | | |
|--------------------------|--------------------|----------------------|
| Abbyville | Bushong | Edna |
| Abilene | Bushout | Edwardsville |
| Ada | Byers | Effingham |
| Adams | Caldwell | (Atchison County) |
| Admire | Caney | El Dorado |
| Agenda | Canton | Elk City |
| Agra | Carbondale | Elkhart |
| Alden | Cassoday | Ellinwood |
| Alexander | Carlyle | Ellis |
| Allen | Cawker City | Elsmore |
| Alma | Cedar | Ellsworth |
| Almena | Cedar Vale | Elwood |
| Altamont | Centralia | Emporia |
| (Labette County) | Chanute | (City High School) |
| Alta Vista | Chapman | (Normal High School) |
| Alton | (Dickinson County) | Englewood |
| Altoona | Chase | Enterprise |
| Americus | Cheney | Erie |
| Andover | Cherokee | Esbon |
| Anthony | (Crawford County) | Eskridge |
| (City) | Cherryvale | Eudora |
| (Spring Township) | Chetopa | Eureka |
| Arcadia | Cimarron | Everest |
| Argonia | Circleville | Fairview |
| Arkansas City | Claffin | Fall River |
| Arlington | Clay Center | Falun |
| Asherville | (Clay County) | Fellsburg |
| Ashland | Clayton | Florence |
| Assaria | Clearwater | Ford |
| Atchison | Climax | Formoso |
| (City High School) | Clifton | Fort Scott |
| (Mount Saint Scholastica | Clyde | Fowler |
| Academy) | Coats | Frankfort |
| Athens | Codell | Fredonia |
| Atlanta | Coffeyville | Frontenac |
| Attica | Colby | Fulton |
| Atwood | (Thomas County) | Galena |
| (Rawlins County) | Coldwater | Galesburg |
| Auburn | Colony | Galva |
| Augusta | Columbus | Garden City |
| Axtell | (Cherokee County) | Garden Plain |
| Baldwin | Concordia | Gardner |
| Bancroft | (City High School) | Garfield |
| Barclay | (Nazareth Academy) | Garnett |
| Barnard | Conway Springs | Garrison |
| Barnes | Copeland | Gaylord |
| Baxter Springs | Corning | Geneseo |
| Beattie | Cottonwood Falls | Girard |
| Belle Plaine | (Chase County) | Glasco |
| Belleville | Council Grove | Glen Elder |
| Beloit | Courtland | Goddard |
| Belpre | Covert | Goff |
| Benedict | Cuba | Goodland |
| Bennington | Cullison | (Sherman County) |
| Bentley | Culver | Grainfield |
| Benton | Cunningham | Great Bend |
| Bern | Deerfield | Greeley |
| Berryton | Delia | Greenleaf |
| Beverly | Delphos | Greensburg |
| Blue Mound | Denison | (Kiowa County) |
| Blue Rapids | Denton | Grenola |
| Bonner Springs | Derby | Gridley |
| Bronson | De Soto | Grinnell |
| Brookville | Dexter | Gypsum |
| Brownell | Dighton | Halstead |
| Bucklin | (Lane County) | Hamilton |
| Buffalo | Dodge City | Hamlin |
| Buhler | (City High School) | Hanover |
| Bunker Hill | (Saint Mary of the | Hardtner |
| Burden | Plains Academy) | Harlan |
| Burlingame | Dorrance | Harper |
| Burlington | Douglass | Hartford |
| Burns | Downs | Harveyville |
| Burr Oak | Dunlap | Haven |
| Burrton | Easton | Havensville |

| | | |
|---|---|---|
| Haviland (City High School) (Haviland Academy) | Le Roy | Newton (Bethel College Academy) (City High School) |
| Hays | Lewis | New Ülysses (Grant County) |
| Hazelton | Liberal | Nickerson (Reno County) |
| Herrington | Lincoln | Norcatour |
| Hesston (Hesston Academy) | Lindsborg (Bethany College Academy) (City High School) | Northbranch (Northbranch Academy) |
| Hiawatha | Linn | Norton (Norton County) |
| Highland | Little River | Nortonville |
| Hill City | Logan | Norway |
| Hillsboro (City High School) (Tabor College Academy) | Longford | Norwich |
| Hoisington | Long Island | Oakland |
| Holcomb | Longton | Oakley |
| Hollenburg | Lost Springs | Oberlin (Decatur County) |
| Holton | Louisburg | Offerle |
| Hope | Louisville | Oketo |
| Horton | Lovewell | Olathe |
| Howard | Lucas | Olsburg |
| Hoxie | Luray | Onaga |
| Hoyt | Lyndon | Oneida |
| Hugoton (Stevens County) | Lyns | Osage City |
| Humboldt | Macksville | Osawatomie |
| Hutchinson | Madison | Osborne |
| Independence (Montgomery County) | Mahaska | Oskaloosa |
| Ingalls | Maize | Oswego |
| Iola | Manhattan (City High School) (Sacred Heart Academy) | Ottawa (City High School) (University Academy) |
| Irving | Mankato | Overbrook |
| Isabel | Maple Hill | Overland Park |
| Jamestown | Marion | Oxford |
| Jarbalo | Marquette | Ozawkie |
| Jetmore (Hodgeman County) | Marysville | Padonia |
| Jewell | Mayetta | Palco |
| Johnson (Stanton County) | McCune | Paola (City High School) (Ursuline Academy) |
| Junction City | McDonald | Paradise |
| Kanopolis | McLouth | Parkerville |
| Kansas City (Argentine) (Catholic) (Central) (Sumner) (Wilson) | McPherson (City High School) (Central College Academy) (McPherson College Academy) | Parsons |
| Keats | Meade | Partridge |
| Kensington | Medicine Lodge | Pawnee Rock |
| Kincaid | Melvorn | Paxico |
| Kingman | Meriden | Peabody |
| Kinsley | Merriam | Perry |
| Kiowa | Mildred | Peru |
| Kipp | Milton | Phillipsburg |
| Kirwin | Miltonvale (Wesleyan Academy) | Piedmont |
| La Crosse | Minneapolis | Pittsburg |
| La Cygne | Minneola | Plainville |
| La Harpe | Moline | Pleasanton |
| Lakin | Montezuma | Plevna |
| Lane | Monument | Pomona |
| Langdon | Moran | Portis |
| Lansing | Morehead | Potter |
| Larned | Morganville | Potwin |
| Latham | Morland | Powhattan |
| Lawrence (City High School) (Oread High School) | Morrill | Pratt |
| Leavenworth (Catholic High School) (City High School) (St. Mary's Academy) | Mound City | Pretty Prairie |
| Lebanon | Moundridge | Preston |
| Lebo | Mound Valley | Princeton |
| Lecompton | Mount Hope | Protection |
| Lenora | Mulberry | Quenemo |
| Leon | Mullinville | Quinter |
| Leonardville | Mulvane | Ramona |
| Leoti (Wichita County) | Munden | Randolph |
| | Muscotah | Ransom |
| | Narka | Rantoul |
| | Natoma | Reading |
| | Neal | Redfield |
| | Neodesha | Reece |
| | Neosho Falls | Republic |
| | Neosho Rapids | Reserve |
| | Ness City | |
| | Netawaka | |

| | | |
|------------------------|-------------------------|-------------------------|
| Richmond | Soldier | Wa Keeney |
| Riley | Solomon | (Trego County) |
| Robinson | South Haven | Wakefield |
| Rock Creek | Spearville | Waldo |
| Rosalia | Spivey | Walnut |
| Rosedale | Spring Hill | Walton |
| Rose Hill | Stafford | Wamego |
| Rossville | Stark | Washington |
| Rozel | Sterling | Waterville |
| Russell | Stilwell | Wathena |
| Russell Springs | Stockton | Waverly |
| Sabetha | Summerfield | Webster |
| Saffordville | Sylvan Grove | Welda |
| Saint Francis | Sylvia | Wellington |
| Saint John | Syracuse | (Sumner County) |
| (Antrim High School) | Tampa | Wellsville |
| (City High School) | Tescott | Westmoreland |
| Saint Marys | Thayer | Westphalia |
| (City High School) | Tonganoxie | Wetmore |
| (Immaculate Conception | Topeka | Wheaton |
| High School) | (City High School) | White City |
| Salina | (Catholic High School) | White Cloud |
| (City High School) | (College of the Sisters | Whitewater |
| (Kansas Wesleyan | of Bethany) | Whiting |
| Academy) | (Highland Park High | Wichita |
| (Sacred Heart Academy) | School) | (Cathedral High School) |
| Santa Fe | (Washburn Rural High | (City High School) |
| (Haskell County) | School) | (Friends University |
| Savonburg | Toronto | Academy) |
| Sawyer | Towando | (Mount Carmel |
| Scandia | Tribune | Academy) |
| Scott City | (Greeley County) | Williamsburg |
| Scottsville | Troy | Willis |
| Scranton | Turner | Wilmore |
| Sedan | Turon | Wilsey |
| Sedgwick | Udall | Wilson |
| Seneca | Uniontown | Winchester |
| Severance | Utica | Windom |
| Severy | Valley Center | Winfield |
| Sharon | Valley Falls | Winona |
| Sharon Springs | Vermilion | Woodbine |
| Silver Lake | Vinland | Woodston |
| Simpson | Viola | Yates Center |
| Smith Center | | |

Undergraduate Degrees and Certificates

For graduation, one must complete one of the four-year curricula as shown elsewhere. These are believed to provide for the necessities of most students who seek an institution of this kind, and departures from the specified work are not encouraged. Under special conditions, however, such College substitutions are allowed as the interests of the student demand. The total requirement, including military science or physical training, is about 134 hours, or semester credits, a semester credit being one hour of recitation or lecture work, or three hours of laboratory work a week, for one semester of eighteen weeks. A student, to be considered as a candidate for graduation, must have done his last year's work in residence. In special cases, candidates would be considered who have done three full years of work here and have done their last in an institution approved by the Faculty.

DEGREES

The degree of bachelor of science (B. S.) is conferred upon those completing the four-year curriculum in agriculture, agricultural engineering, mechanical engineering, electrical engineering, civil engineering, flour-mill engineering, architecture, home economics, industrial journalism, agricultural chemistry, bio-chemistry, industrial chemistry, or general science.

The degree of doctor of veterinary medicine (D. V. M.) is conferred upon those completing the four-year course in veterinary medicine.

CERTIFICATES

An appropriate certificate is granted upon completion of any one of the following:

1. The three-year curriculum in music.
2. The first two years of the four-year course in agriculture.
3. The short course in agriculture.
4. The two-year curriculum in public-school music.
5. The one-year course in lunch-room management.
6. The housekeepers' course, lasting about fifteen weeks.
7. The eight-week creamery short course.
8. Any one of the special courses related to engineering.

Graduate Study

THE ADMINISTRATION OF GRADUATE COURSES

The administration of the graduate courses is vested in the Graduate Council. This body consists of seven members, selected from the different divisions of the College as follows: Agriculture, two; Engineering, one; General Science, two; Home Economics, one; and Veterinary Medicine, one. The members of the Graduate Council are appointed and its chairman designated by the President.

Graduate courses may be offered by members of the Graduate Faculty only. The Graduate Faculty consists of all those recommended by the department heads and approved by the Graduate Council as qualified to give graduate instruction. Its chairman is the chairman of the Graduate Council.

The Graduate Council determines, subject to the authority of the President and the Board of Administration, and in accordance with any general regulations adopted by the Graduate Faculty, matters of curriculum, admission to graduate study and to candidacy to advanced degree, and other matters which relate to the proper administration and development of graduate work in the College.

ADMISSION

Admission to graduate courses is granted to graduates of institutions whose requirements for the bachelor's degree are substantially equivalent to those of the Kansas State Agricultural College. Admission to the graduate courses, however, may not be construed to imply admission to candidacy for an advanced degree. Such candidacy is determined by the Graduate Council upon the recommendation of the major instructor after the student has demonstrated by his work for a period of two months or longer that he has the ability to do major work of graduate grade. A mere accumulation of grades will not lead to a degree.

Three classes of applicants are recognized: (1) those who have received a bachelor's degree and wish to broaden their education without reference to an advanced degree; (2) those who wish to become candidates for advanced degrees, but are deficient in undergraduate preparation; and (3) those who wish to become candidates for an advanced degree and whose preparation is adequate.

Applicants of Class 1 are admitted at once, on evidence of graduation, to approved graduate courses. Those of Class 2 are admitted to graduate standing, but must at once make up their deficiencies by taking the necessary work in the undergraduate courses or by arrangement with the head of the department involved. Upon making up all deficiencies, Class 2 applicants are recognized as of Class 3. The latter are admitted to candidacy as previously provided.

Application blanks for admission to graduate courses may be secured from the Registrar. Every applicant for admission must submit with his application an official transcript of his college record.

Students applying for graduate work should present themselves to the chairman of the Graduate Council, after registering at Nichols Gymnasium, for instructions concerning assignment to classes. On regular registration days (see College Calendar), the chairman will be found at Nichols Gymnasium, on other days in Room 38, Waters Hall.

REGISTRATION

Students who have been admitted to the graduate courses are required to register with the College Registrar and with the chairman of the Graduate Council, at the beginning of each semester, unless special permission for later registration has been granted by the chairman of the Graduate Council. Credit toward the fulfillment of the residence requirements dates from the time of registration and not from the beginning of the semester when the student enters.

CANDIDACY FOR MASTER'S DEGREE

Candidates for the degree of master of science (M.S.) are required to spend at least one collegiate year in residence, except under the special conditions noted below. The equivalent of thirty-two semester credits including a thesis must be satisfactorily completed. Not more than sixteen credits, including thesis, may be secured in a single semester. Students holding half-time graduate assistantships may not obtain more than eight credits, including thesis, in one semester.

GRADES Graduate students' work is graded in five classes: E, G, M, P, and F. The last indicates a failure. P indicates unsatisfactory though passable work. The degree will not be conferred on any student who does not receive a grade of G or higher in three-fourths of the courses taken, including thesis. A failure or absence from examination in any course may prevent the conferring of the degree, and failure in any course in the major field precludes conferring the degree in the same year.

LANGUAGE REQUIREMENTS. A reading knowledge of a modern language in the field of the major subject is highly desirable. At the discretion of the department in which the major work is done, this may be required for the degree. This requirement must be met before the beginning of the last semester preceding the conferring of the degree by the student's presenting himself to the head of the Department of Modern Languages for examination. An earlier meeting of this requirement is highly desirable.

MASTER'S THESIS. Each candidate for a master's degree is required to present a thesis on some subject approved by the Graduate Council upon the recommendation of the instructor in charge of his major work.

The thesis ordinarily demands one-fourth of the student's time and may not exceed one-third of it. The thesis must be typewritten according to the specifications to be obtained from the office of the chairman of the Graduate Council.

Under proper conditions, a student of unusual attainment may be allowed to complete *in absentia* the last fourth of his work if this is devoted to his thesis. To secure this privilege, the student must have spent the equivalent of one semester and a half in residence and have creditably passed not less than twenty-four credits of graduate work; must petition for the privilege; must submit to the chairman of the Graduate Council an outline of his proposed investigation, approved by the head of his major department; and must submit satisfactory evidence that adequate facilities are available to him at the place where he proposes to do the work.

A preliminary report on the progress of all theses must be made by the major instructors to the chairman of the Graduate Council before April 1 of the year when the degree is conferred. Three complete copies of the theses as approved must be furnished not later than May 15 to the chairman of the Graduate Council. One of these copies will be deposited in the College Library, one with the dean of the division involved, and the other placed on file in the department in which the major subject is taken.

A candidate for the master's degree is subject to a rigid oral examination covering his major and minor subjects and thesis by a committee consisting of the dean of the division in which his major subject was taken, the member of the Graduate Council from that division, and the instructors with whom he has taken major and minor work.

PROGRAM OF STUDY

In carrying graduate work, the student is expected to assume the initiative and the responsibility. It is important to recognize in the beginning that graduate work does not consist in the fulfillment of routine requirements alone. The various courses as well as the assistance and advice of the instructors are to be regarded simply as aids in acquiring the methods, discipline, and spirit of independent research.

Each candidate for a degree is expected to have a wide knowledge of his subject and of related lines of work. This is usually obtained only by a wide range of private reading and study outside the immediate field covered by the formal courses to which he may be assigned.

The branch of knowledge to which the student expects to devote the larger part of his time is termed his major subject. The other fields of study selected, which will necessarily be more restricted in scope, are termed minor subjects. The latter should be chosen with reference to their direct bearing on the major subject.

Approximately two-thirds of a student's time is devoted to his major subject and one-third to one or more minor subjects. The word subject is used to designate a recognized field of study, and is not defined by the limits of a department. The nature and distribution of the majors and minors are approved by the Graduate Council, upon the recommendation of the instructor with whom the major is taken.

The program of study suggested by the major instructor and approved by the Graduate Council is made the basis of the formal assignment to courses at the beginning of each semester and of the summer session.

It will be noted that in the announcements of the various departments of the College that certain courses are open to both graduate and undergraduate students. No credit earned during the undergraduate course may be counted for graduate credit, unless registered, at the time taken, with the chairman of the Graduate Council as credits in excess of those required for the bachelor's degree.

GRADUATE ASSISTANTSHIPS

In order to encourage graduates of this and similar institutions to continue their studies and to pursue advanced work leading to a master's degree, the College has established graduate assistantships in several departments. These assistantships demand half the time of the student for laboratory or research assistance along the line of his major work. The remainder of his time is given to graduate work. No graduate assistant may receive more than eight graduate credits per semester nor satisfy the residence requirement in less than two years.

Graduate assistantships paying a salary fixed each year by the Board of Administration have been established as follows:

| <i>Subject</i> | <i>Number</i> | <i>Date vacant</i> |
|-----------------------------------|---------------|--------------------|
| Animal Husbandry | 2 | September, 1921 |
| Bacteriology | 1 | September, 1920 |
| Crops | 1 | September, 1920 |
| Dairy Husbandry | 1 | September, 1920 |
| Electrical Engineering | 1 | September, 1920 |
| Food Economics and Nutrition..... | 1 | September, 1921 |
| Household Economics | 1 | September, 1921 |
| Plant Pathology | 1 | September, 1920 |
| Poultry Husbandry | 1 | September, 1920 |
| Soils | 1 | September, 1920 |
| Steam and Gas Engineering..... | 1 | September, 1920 |
| Zoölogy | 1 | September, 1920 |

Appointments for all assistantships are made annually in March or soon thereafter for the following year. Students desiring such appointments may obtain application blanks from the chairman of the Graduate Council.

GRADUATE WORK IN THE SUMMER SESSION

Graduate students desiring to do a part or all of the work for the master's degree in the summer may complete the residence requirements by pursuing graduate work for four summer sessions. In special cases it may be possible to complete the residence requirements for the master's degree as indicated above under Candidacy for Advanced Degree.

A detailed announcement concerning the graduate work in the Summer School may be had on application to the Dean of the Summer School, Kansas State Agricultural College, Manhattan, Kan.

Professional Degrees

ENGINEERING AND ARCHITECTURE

Graduates in engineering or in architecture from this College previous to 1917 who have been engaged in engineering or architectural practice for a period of five years or more, and graduates in 1917 or later who have been engaged in engineering or architectural practice for a period of three years or more, will be granted the professional degrees of M. E., C. E., E. E., Agr. E., F. M. E., or Architect, under the following conditions:

The graduate to be eligible to a degree must submit a statement of his experience and a thesis covering some phase of his practice. This thesis and experience must be approved by the head of the department in which the degree is requested, by the Dean of the Division of Engineering, and by the College Committee on Graduate Study, before the granting of such a degree will be recommended to the College Faculty and to the Board of Administration.

General Information

DUTIES AND PRIVILEGES

Good conduct in general, such as becomes men and women everywhere, is expected of all students. Every possible aid and stimulus toward the development of good character, is given by the various Christian organizations of the College and the town and by the College itself. Every student is expected to render a good account of himself in the College community life. For those who are highminded and reasonable, no other requirements need be expected. College discipline is confined chiefly to sending away those whose conduct, after fair trial, makes their further attendance at the College unprofitable or inadvisable.

In order that a fine type of democratic sociability may be fostered among students and faculty a large community recreation and rest center has been recently established (1920) in Anderson hall, the administrative building. This center, one of the largest rooms on the campus, is furnished with divans, arm chairs, and writing tables in wicker and is neatly and beautifully decorated. During vacant hours and between classes students and faculty gather here for rest and conversation. The room is also available for student and faculty receptions and parties during the late afternoon and the evening hours.

Absences from class or laboratory periods must be accounted for to the instructor concerned. Permission for absence from College for one or more days must be secured in advance from the dean of the division in which the student is registered. Students cannot honorably leave the College before the close of a semester except by previous arrangement with the deans concerned.

Opportunities for general scientific, literary and forensic training are afforded, in addition to the College courses, by various literary and scientific societies and clubs. The Science Club, meeting monthly, admits to membership all instructors and students interested in science. Papers given at the meetings of the Science Club represent original work in science done at the institution. The program is further characterized by free discussion of the papers presented and by general scientific notes and news contributed by the members. The numerous literary and professional societies, which are described elsewhere in the catalogue under the title "Student Organizations," also afford excellent training in their diverse lines.

At various times during the year the College halls are opened for social, literary, musical, and dramatic entertainments furnished by lecture courses, by the literary societies, by the Department of Music, by the Dramatic Club, by the Oratorical Association, and by other organizations of students and instructors. Addresses by prominent speakers, men of affairs, and persons prominent in scientific, educational, and social work are of frequent occurrence.

EXPENSES

TUITION There is no charge for tuition. Class instruction in music is free, but fees are charged for individual instruction. (See Department of Music for statement of fees for music.)

MATRICULATION FEE A matriculation or entrance fee of \$10 for residents of Kansas, or \$15 for nonresidents, is charged all students in College curricula and in the School of Agriculture. This fee is not charged Summer School students or short course students.

INCIDENTAL FEE. An incidental fee of \$10 a semester or summer term for residents of Kansas, or \$15 a semester or summer term for nonresidents, is charged. Students in short courses of more than eight weeks duration pay an incidental fee of \$10. The incidental fee for students in short courses related to engineering is \$10; such students are entitled to remain at the College as long as it is necessary for them to complete their course of study, but not to exceed eighteen weeks. Eight-week short-course students pay an incidental fee of \$5.

SICK-BENEFIT FEE Each student in the College or School of Agriculture pays a sick-benefit fee of \$1.50 for each semester or summer term. Students in special courses related to engineering (short courses in mechanic arts) and students in short courses of more than eight weeks duration pay a sick-benefit fee of \$1.50. For students in the farmers' short course or the commercial creamery short course this fee is \$1.

The sick-benefit fee entitles the student to receive the service of the College physician for any illness contracted while in College. The fee does not include the cost of medicine, surgical operations, reduction of fractures, hospital fees, or the treatment of chronic conditions. As far as possible, and provided the students requesting such services live within the city limits, the College physician visits in their rooms students who are too ill to go to the physician's office.

The College maintains on the campus a contagion hospital having separate wards for men and women. This hospital is in charge of a matron who resides continuously in the building and cares for the patients under the direction of the College physician. Students, when suffering from or suspected of having any contagious disease, are admitted to the hospital on the recommendation of the College physician. The student's only expense for hospital service is a fixed charge of \$1.50 a day. The aim of the College in providing this hospital is to prevent contagious diseases among the students and, in case the student should contract such a disease, to make it unnecessary to quarantine a rooming house where there are many students.

LATE REGISTRATION FEE. For unexcused late registration the student is charged \$1.

LABORATORY EXPENSE. In all laboratories students are required to pay for supplies used and for apparatus broken or lost. The cost in the several subjects ranges from 50 cents to \$7.50 a semester. In the special courses related to engineering, the laboratory charges are fixed at from \$18 to \$36 for the entire course.

COMMENCEMENT FEE. On graduation students pay a commencement fee of \$5 to cover the cost of the diploma and other commencement expenses.

TEXTBOOKS. The average cost of textbooks is about \$8 a semester in most of the curricula. For the first semester the cost is about \$12. There is considerable variation from term to term and in the different curricula.

GYMNASIUM SUITS. Each young woman taking physical training must have an approved gymnasium suit costing about \$4.50. Complete gymnasium suits for young men cost about \$5.

ROOMS. Rooms are not furnished by the College. They are readily obtainable in the city at a cost of from \$10 to \$15 a month for a room suitable for two occupants. Less desirable quarters and less desirable locations may be obtained at a lower rate. There are great differences in the accommodations offered. Those for which the higher prices are charged are modern in all respects, and light, heat, and bath are included in the cost stated.

BOARD. The cost of board depends largely upon individual requirements. In clubs and private boarding houses the cost is usually from \$5 to \$7 a week. Students may board themselves at a smaller money outlay. The College operates a first-class cafeteria, where all meals may be obtained, except on Sundays, at moderate prices. Food is furnished at cost and the expense to the student depends upon the care and judgment which he employs. The College also operates a mess-hall where meals are served every day in the week at thirty cents each. This is especially convenient for men in the special courses related to engineering.

LAUNDRY. The expense for laundry may be estimated at 40 cents to 70 cents a week, depending upon individual requirements.

BOARDING AND ROOMING HOUSES

The Christian Associations of the Agricultural College keep on file the official list of boarding and rooming houses. All correspondence relative to boarding accommodations, in advance of the student's arrival in Manhattan, may be addressed to the Secretary of the Young Men's Christian Association, to the Secretary of the Young Women's Christian Association, or to the Registrar of the College. Upon arrival in Manhattan, young men should go directly to the Y. M. C. A. building, corner of Eleventh and Fremont streets, or to the office of the Y. M. C. A. secretary, in Anderson Hall on the College campus. Young women upon arrival should go directly to the Y. W. C. A. offices in Home Economics Hall on the campus. The cars from the Union Pacific station pass directly by the Y. M. C. A. building. Jitney service may be had from either station.

For three days before the opening of the fall semester and for the first three days after the opening day, committees from these associations meet trains and assist in directing new students, either to the association buildings or directly to proper boarding places. The associations make no charge for their services or for lists of all approved boarding places, and new students should depend absolutely upon the recommendations of the association committees.

SELF-SUPPORT

The courses of instruction are based upon the supposition that the student is here for study, and therefore a proper grasp of the subjects cannot be obtained by the average student unless the greater part of his time is given to College work. Students of limited means are encouraged and aided in every possible way, but unless exceptionally strong, both mentally and physically, such students are advised to take lighter work by extending their courses, in case they are obliged to give any considerable time to self-support. As a rule, a student should be prepared with means for at least a semester, as some time is required in which to make acquaintances and to learn where suitable work may be obtained.

There are various lines in which students may find employment. The College itself employs labor to the extent of about \$1,200 a month, at rates varying from 20 to 35 cents an hour, according to the nature of the employment and the experience of the employee. Most of this labor is upon the College farm, in the orchards and gardens, in the shops and the printing office, for the janitor, etc. Various departments utilize student help to a considerable extent during the vacations. Students demonstrating exceptional efficiency, ability, and trustworthiness obtain limited employment in special duties about the College. Many students secure employment in various lines in the town, and some opportunity exists for obtaining board in exchange for work, with families either in town or in the neighboring country.

Labor is universally respected in the College community, and the student who remains under the necessity of earning his way will find himself absolutely unhampered by discouraging social conditions. Indeed, over one-third of the students support themselves wholly, while a third support themselves in part. False standards regarding physical work do not exist, and are not tolerated by the board of instruction or by the student body as a whole. Absolutely democratic standards prevail at the College, and students are judged on the basis of their personal worth and efficiency alone.

Students are assisted to obtain employment by means of the employment bureaus maintained by the Young Men's Christian Association and by the Young Women's Christian Association of the College, with secretaries of which organizations correspondence is encouraged.

STUDENT LOAN FUNDS

THE ALUMNI LOAN FUND. The Alumni Association of the Kansas State Agricultural College has created a loan fund, chiefly by means of payments by which the alumnus is relieved from further regular dues in the association. Members are due to pay the association \$1 a year, and on payment of \$20 in one sum they are relieved from such dues. The fund so created is lent to students at 5 per cent per annum. The fund is administered by a committee appointed by the directors of the Alumni Association. The committee announces no specific rules governing the granting of loans, but in general gives preference to smaller amounts on short time over larger amounts which cannot be paid for several years.

Alumni are urged to add to the funds thus made available to worthy students. Students wishing loans from this fund may address Dean J. T. Willard, Chairman of the Alumni Loan Fund Committee, Manhattan, Kan.

THE HENRY JACKSON WATERS LOAN FUND. The Henry Jackson Waters loan fund consists of the royalties received from the Kansas sales of President Waters' textbook, *The Essentials of Agriculture*. The royalties so far have amounted to more than \$1,000, which sum has been augmented by gifts of \$100 each from Senator Capper and L. R. Eakin, of Manhattan, and by smaller amounts received from some others. The entire amount has been loaned nearly all the time. The fund is administered by a committee appointed by the President of the College and approved by the Board of Administration. The rules for the loans are likewise approved by the Board. The rules allow emergency loans of \$25 to any student who has completed two semesters of work in this College. Juniors may borrow \$100 and seniors may borrow \$150. Applications for loans should be made to Professor Albert Dickens, Chairman of the Waters Loan Fund Committee, Manhattan, Kan.

THE MANHATTAN STUDENT LOAN FUND. The members of the Chamber of Commerce of Manhattan have raised a fund which now amounts to \$2,800 and is being augmented constantly. This is loaned to deserving students at 5 per cent per annum. Applications for loans from this fund should be addressed to the secretary, Chamber of Commerce, Manhattan, Kan.

THE STATE FEDERATION OF WOMEN'S CLUBS' LOAN FUND Each year several of the young women students of the Kansas State Agricultural College are beneficiaries of the State Federation of Women's Clubs through the administration of its liberal young women's student loan fund. Information regarding this fund can be obtained by addressing Dean Mary P. Van Zile, Manhattan, Kan.

PRIZES AND MEDALS

STOCK JUDGING. The Block and Bridle Club offers four medals, one gold, one silver, and two bronze, to students obtaining the highest four places in the club's stock-judging contest. The same organization offers prizes of books for stock judging. The Faculty of the Department of Animal Husbandry offers prizes of books or papers on stock judging.

DAIRY JUDGING. The Student Dairy Association each year holds a dairy-judging contest, and offers a gold, a silver, and a bronze medal to students obtaining the highest three places.

PLAY WRITING. The Purple Masque Dramatic Fraternity offers each year a prize of \$50 for the best original play written by a student of the Kansas State Agricultural College and suitable for presentation by the fraternity.

FESTIVAL WEEK PRIZE. The Festival Week Management (Departments of Music and Public Speaking) announce a prize of \$200 for the best play written by a student or Faculty member and suitable for presentation during Festival Week of 1921. As an alternative, the judges are authorized to apportion this amount for three one-act plays (\$100 for first, \$60

for second, and \$40 for third) in case no play is of sufficient merit to warrant its presentation during Festival Week.

ORATORY. The literary societies, through the Oratorical Board, offer each year, in the Intersociety Oratorical Contest, the following prizes:

First prize, gold medal and \$25.

Second prize, silver medal and \$15.

Third prize, bronze medal and \$10.

The Oratorical Board also finances the sending of a representative from the College to the annual Peace Oratorical Contests, to the winners of which valuable prizes in money are awarded.

The Department of Public Speaking sends to the annual Missouri Valley Contest an orator as the representative of the College. In this contest valuable prizes in money and medals are awarded.

SHORT-STORY WRITING. The Quill Club offers annually a gold medal to the student of Kansas State Agricultural College writing the best short story in a contest held by this organization.

MILITARY TRAINING. In the Department of Military Training prizes and medals are offered as follows:

1. The Knostman cup, offered by the Knostman Clothing Company, of Manhattan, to the company winning the intercompany basket-ball series.
2. The Henderson Ames cup, donated by the Henderson Ames Company, of Kalamazoo, Mich., to the company winning the outdoor Henderson Ames match.
3. The Governor Hodges cup, donated by ex-Governor Hodges to the company having the highest percentage on outdoor range.
4. The Metcalf cup, donated by General W. S. Metcalf to the member of the Rifle Club having the highest aggregate in gallery matches of the United States military colleges.
5. A saber or pistol to the captain having the best-drilled company.
6. A silver-mounted saber knot to the first lieutenant of the best-drilled company.
7. A silver-mounted saber knot to the second lieutenant of the best-drilled company.
8. A silver medal to the corporal of the best-drilled squad.
9. A bronze medal to each private of the best-drilled squad.
10. A gold medal to the best-drilled cadet.

The team members of the College Rifle Club winning the series of intercollegiate matches in gallery-practice competition are issued individual marksmanship medals by the National Rifle Association of America.

SCHOLARSHIPS

MILLING INDUSTRY. The Kansas Flour Mills Company offers \$300 annually to advanced students specializing in milling industry. This sum has been divided into three scholarships which are open to students in the Divisions of Agriculture, General Science, and Engineering who are specializing in flour milling and other milling-industry work. They are awarded on or before June 1 of each year, and except in unusual cases are not awarded to students below junior standing. Other things being equal, preference is given to residents of the State of Kansas.

In awarding these scholarships, the following points regarding the student are considered: Course of study pursued, scholarship, character

and personality, and financial condition. The stipend is divided into ten monthly payments, the first payment being made September 1 and the last, June 1.

DEBATE. In the Department of English two scholarships of the value of \$100 each, one for men and one for women students, are offered annually for proficiency in intercollegiate debating.

FELLOWSHIPS

Fellowships, or graduate assistantships, have been established for some years by action of the Board, and are available in several departments of the College. For full details, see a previous paragraph under the heading "Graduate Assistantships."

BUSINESS DIRECTIONS

General information concerning the College may be obtained from the President or the Registrar. Financial matters are handled through the office of the Business Manager, State Board of Administration, Topeka, Kan.

Scientific and practical questions, and requests for special advice along lines in which the College and the Experiment Stations are prepared to give information, should be addressed to the heads of the departments concerned with the work regarding which information is sought.

Applications for farmers' institutes should be made as early in the season as possible, to the Division of College Extension. Applications for the publications of the Agricultural Experiment Station should be addressed: Director of the Agricultural Experiment Station, Manhattan, Kan.

Donations to the Library should be addressed to the Librarian, and donations to the Museum to the Curator of the Museum.

STUDENT ASSEMBLY

The Student Assembly is held one hour each week. At this time the library, offices, classrooms, and laboratories are closed and the students gather in the College Auditorium. These assembly exercises consist of devotional services, music, and addresses. The devotional exercises are conducted by members of the Faculty, by resident ministers of the various denominations, or by prominent visitors. Excellent music is provided by the College Orchestra, by members of the Department of Music, and by available outside talent. In addition to the addresses delivered by the President and by members of the Faculty, many prominent leaders of state and national reputation are invited to address the assembly. Thus the Student Assembly has become a center of true culture and enlightenment. Although attendance is not compulsory, it is common to see nearly two thousand enthusiastic students present during these exercises.

COLLEGE PUBLICATIONS

The official organ of the College is *The Kansas Industrialist*, published and printed at the College weekly by the Department of Industrial Journalism and Printing. Its pages are filled with articles of interest, with special reference to agriculture and the industries. Particular attention

is paid to information concerning the work of the College, to investigations of the Experiment Stations, and to local and alumni news. *The Kansas Industrialist* will be sent to any address for seventy-five cents a year. The alumni may have *The Kansas Industrialist* free upon application.

The Division of College Extension issues a monthly publication entitled *Agricultural Education*, of special interest to institute members.

The students of the College publish a semi-weekly periodical, *The Kansas State Collegian*, in the interest of the students at large. This paper is edited and managed by a staff elected by students. A College annual, *Royal Purple*, is published each year by the senior class.

EXAMINATIONS

Examinations are held at the last regular recitation periods of the respective studies at the end of each semester. Whether the examination is to extend over the last two periods or over one only is left to the decision of the individual instructor.

Any student who receives a grade of E for the semester, in any subject, and whose absences for all causes from the class in such subject do not exceed one-tenth of the number of times the class is scheduled to meet during the semester, may be excused from the final examination in that subject, at the discretion of the instructor; provided, however, that instructors are to announce such exemption lists in their respective subjects not earlier than the last session of the class preceding the final examinations.

Examinations to remove conditions are held on the fourth Saturday of each semester. A student who has received the grade C is entitled to take such special examination, provided the instructor or the department head be notified of the student's desire to take the examination not later than the Tuesday evening preceding the Saturday set for the examinations. If a subject in which a student is conditioned is not passed at the first opportunity, the grade is changed from C to F.

Permission for examination in subjects not taken in class must be obtained on recommendation of the professor in charge, from the dean of the division in which the student is assigned. Permission to take such examination is not granted unless the preparation for it is made under an approved tutor. All such examinations are under the immediate supervision of the professor in whose department the subject falls.

GRADES

Student grades are designated by the letters E, G, M, P, C, F, and U, having the following significance and order of rank:

The grade E designates really distinguished achievement, and is the net resultant of exceptionally good mental ability in conjunction with serious application. It is expected that this grade will not include more than ten per cent of all grades given a class, and usually will include about five per cent.

The grade G represents superior achievement, better than that exhibited by the average student, but not distinguished. It is recognized as a mark of considerable honor and is the resultant of high ability and

fair application, or of fair ability and serious application. The percentage of students assigned this grade will depend somewhat upon the number assigned grade E, but the sum of grades E and G should approximate twenty-five per cent of all grades assigned.

The grade M represents the standing of about half of all students in the College. It means achievement equal to that of the average of students, and includes about half of all student grades. It indicates neither superior nor inferior accomplishment.

The grade P, meaning passed, represents achievement of a grade below that of the average of students. It indicates a student's position as being in the upper part of the lower fourth of the class and his work as being such as may be described as poor, or inferior. The number of grades P awarded, together with the grades C and F, should not, on the whole, exceed twenty-five per cent of all, and are expected to include about that proportion.

The grade C, meaning conditioned, is the symbol used to represent two types of inferior work: (a) that which is deficient in quality, and (b) that which is satisfactory as to quality but inadequate as to quantity. The results of examinations to remove conditions are reported simply as P (passed) or F (failed), and such examinations not taken are recorded as F.

The grade F, meaning failed, is used to indicate work that is so unsatisfactory as to require that the work be repeated in class or under an approved tutor.

The letter U, meaning unfinished, is reported when, in the judgment of the instructor, the student deserves further time to complete work which has been interfered with by illness or other excusable cause of absence or disability. This is only a temporary report and in no way prejudices the student's final grade in a course.

PENALTIES

A student who, at the end of the semester, receives grades below passing in fifty per cent or more of the work to which he is assigned is required to leave College for at least one semester unless there are sufficiently extenuating circumstances, in which case his dean may suspend the rule and allow an assignment to twelve semester credits of work.

Any student who, at the end of a semester, receives grades below passing in twenty-five per cent of his assigned work is allowed not more than seventy-five per cent of regular work the next semester.

Any student who is found to be persistently inattentive in his College work is at once temporarily suspended by his dean, and reported to the President for permanent suspension.

HONORS

In each of the divisions of the College "junior honors" are awarded at Commencement to not more than five per cent of the junior class having the highest standing up to the close of the junior year.

In a similar manner "senior honors" are awarded to not exceeding five per cent of the senior class having the highest standing up to the close of the senior year.

HONOR SOCIETIES

A chapter of Phi Kappa Phi, an honor scholarship fraternity, membership in which is open to honor graduates of all departments of American universities and colleges, was installed at the Kansas State Agricultural College on November 15, 1915. The eligibility of undergraduates to membership is determined on the basis of their scholarship. The candidates are elected to membership at the October and April meetings of the chapter. Besides this, there are a number of honor fraternities, sororities and societies which are open to students in different divisions of the College or in different activities. These are treated later under the heading "Student Organizations."

CREDITS FOR EXTRA WORK

Activities connected with the College, but not provided for by any of the curricula, either as required subjects or as electives, are designated as *extra subjects*.

Credit for extra work may be given when the student is regularly assigned to the work in accordance with the general rules governing assignments. A student may be assigned to extra work for credit upon the written recommendation of the instructor in charge of the work. This recommendation is filed in the office of the student's dean, and is effective until revoked.

Credits earned for extra work may be counted as part or all of the electives in any of the College curricula. In curricula that do not include electives, credits for extra work are available only as substitutions for required work, and must be approved in the regular way before becoming effective. A total of not more than eight semester credits may be allowed a student for extra work, and not more than two of these may be obtained in any one semester.

The number of semester credits that may be allowed for extra work is as follows:

| <i>Subject</i> | <i>Per semester</i> | <i>Total</i> |
|---|---------------------|--------------|
| Physical Training | 1 | 4 |
| Orchestra | 1 | 4 |
| Band | 1 | 4 |
| Choral Society | 1 | 4 |
| Debate | 2 | 4 |
| Oratorical Contest | 2 | 4 |
| <i>Kansas State Collegian</i> journalism..... | 1 | 4 |
| Military Science | 2 | 8 |

BIBLE STUDY

Bible study is an elective. Two semester credits are granted for each completed one-year course. Credit may be granted to any one student for not more than two courses. Teachers of classes are to be approved as tutors, and the supervision of the work is placed in the Department of Education. This department also conducts the examinations for credit in Bible study.

COURSE NUMBERS

Each course offered bears a number indicating in a general way the standing of students for whom it is given. Courses for undergraduates bear numbers 101 to 199, courses for undergraduates and graduates bear

numbers 201 to 299, and courses for graduates only bear numbers 301 to 399. The numbers 1 to 29 are applied to studies offered for short course students, the numbers 31 to 49 are assigned to summer school subjects not taught for entrance credit or for college credit, and subjects which give credit in the School of Agriculture are numbered 51 to 99.

In applying this system, the courses offered by any department are numbered independently of all other departments of the College.

CLASSES

The minimum numbers for which classes are organized are as follows:

| | |
|-----------------------------|----|
| School of Agriculture..... | 18 |
| Freshmen or sophomores..... | 12 |
| Juniors or seniors..... | 7 |

This rule is varied only by special permission of the Board of Administration.

Division of Agriculture

FRANCIS DAVID FARRELL, *Dean*

The teaching of rational, practical agriculture is fundamental to development in a state whose principal industries are agricultural. Kansas prospers in direct proportion to the productivity of her soil and to the effectiveness with which it is utilized. Effective utilization of the agricultural resources of the state depends upon the success with which the agricultural industries of the state are developed. In order to succeed in farming it is necessary to know something of the soil, the conservation of its fertility and moisture, and its proper cultivation; the kinds of plants to grow and how to improve them; the selection, breeding, and feeding of live stock; the maintenance of orchards, gardens, and attractive surroundings; farm buildings, and the equipment of the farm and the farm home with modern conveniences; the best methods of marketing the products of the farm; and in addition to all this, how to make the farm home the center of influence for good citizenship in the agricultural community.

A man may learn many of these things through practical experience, and thus become successful in modern farming. But practical experience alone is slow and expensive. The Agricultural College furnishes a means of acquiring systematic training in agriculture which fits young men adequately for the farm for a moderate expenditure of time and money.

In addition to training men for service as farmers, the College prepares students for various other activities which must be carried on if the agriculture of the state and nation is to be developed properly. These activities include scientific investigation of agricultural problems in state and national institutions, agricultural extension work, teaching of agriculture, service in the industries directly involving agriculture, and a variety of other lines of public and private service of an agricultural nature. The demand for well-trained, reliable men in all these lines is always extensive. The primary aim of the College in training men in agriculture is to fit them for service in which they will develop into agricultural leaders, either as farmers or in some other capacity, and as such, contribute to the upbuilding of rural institutions and the improvement of American country life.

EQUIPMENT

The facilities for such training at this College are of a high order. The College owns 1,136 acres of land, which is used for investigation, instruction, and demonstration in the various courses in agriculture and allied branches. The campus, which comprises 160 acres, is one of the best examples of ornamental tree planting and forestry in the State. Students working daily amid such surroundings can scarcely fail to gain

an appreciation or love for the beautiful. A tract of 320 acres is devoted to the work in agronomy; for horticulture and forestry work, 80 acres are used; for dairy work, about 160 acres; and for animal husbandry, about 400 acres. The herds and flocks contain all important breeds of dairy and beef cattle, hogs, horses, and sheep. Many of these animals have won championships at local and State fairs in recent years. With this class of stock available for the work in judging, the student is supplied with types of the best breeds, and becomes familiar with these types by actual handling of the stock.

CURRICULA IN AGRICULTURE

The various needs of the student of agriculture are met by the following curricula:

A four-year curriculum in agriculture.

A six-year curriculum in animal husbandry and veterinary medicine.

Various special courses. (The work of these courses is discussed in another section of the catalogue.)

DEGREES

The four-year course in agriculture leads to the degree of bachelor of science (in agriculture).

The six-year curriculum in animal husbandry and veterinary medicine, the last two years of which are given in the Division of Veterinary Medicine, leads to the degree of bachelor of science at the end of four years, and to the degree of doctor of veterinary medicine at the end of two more years.

THE CURRICULUM IN AGRICULTURE

The four-year curriculum in agriculture is designed to meet the needs primarily of the students who expect to return to the farm. However, the student who completes the curriculum will have had sufficient training to enable him to enter some one of the many lines of agricultural industry as a specialist. The demand for men thus trained is constantly increasing, and such positions offer attractive opportunities for men who by nature and training are adapted to the work. The United States Department of Agriculture, the State colleges and departments of agriculture, high schools, private institutions of secondary and college rank, and a great variety of commercial interests, are constantly demanding men trained in agriculture.

The young man who expects to make farming his life work can start with no better asset than the thorough training in practical and scientific agriculture afforded by the four-year curriculum. The American farmer needs more of the skill that comes through the training of the hand, in order that he may better do the work of farming; but infinitely more, he needs the training of the mind in the fundamental truths that underlie every operation in farming, in order that he may use the skill of the craftsman with reason and judgment. One may learn to plow a field with the greatest skill; the work may be a model of its kind. If, however, it is plowed with utter disregard of the moisture conditions which prevail the result may be a failure. To understand the conditions which

should determine when and how to plow is the work of the trained mind; the other is the work of the trained hand. The farmer and the teacher of farming must possess both kinds of training, and the curriculum has been revised with this fact in view, and has been so arranged that *the student begins his practical training in agriculture on the first day he enters College.*

ANALYSIS OF THE CURRICULUM

One hundred thirty-one semester credits in addition to military science are required for graduates, as follows:

| | Semester credits | |
|--|------------------|-----|
| Prescribed agriculture | 43 | |
| Electives in agriculture, required with their prerequisites..... | 21 | |
| Required in agriculture..... | — | 64 |
| Prescribed in nonagriculture..... | 45 | |
| Electives in nonagriculture, required..... | 6 | |
| Electives that may be nonagriculture..... | 16 | |
| Total allowed in nonagriculture..... | — | 67 |
| Required in military science..... | — | 4 |
| Total semester credits for graduation..... | | 135 |

As shown in the above general outline and in the tabulated curriculum given hereafter, the candidate for graduation must have completed one hundred thirty-five College semester credits. The twelve major electives required must be taken from some one of the departments of the Division of Agriculture. The nine minor electives must support the major work. They may be taken from more than one department, and may even be selected from departments in other divisions of the College, but they must directly strengthen the student's preparation in agriculture. At the discretion of the student, twenty-one elective credits may be nonagricultural. However, six semester credits of the junior electives and the seven senior semester credits, designated "free electives," may be earned in any College credit courses and may be chosen without restriction. Any candidate for a degree in agriculture must also have had at least six months' farm experience approved by the Dean of the Division of Agriculture.

The student who completes the freshman and sophomore years will have had, in addition to the fundamental work in chemistry, zoölogy, botany, English, and physics, practical studies in the physiology of plants and plant diseases, farm crops, live stock, dairying, poultry, and horticulture. These two years give the student a general knowledge of the whole range of practical agriculture, more than one-third of his time in the freshman and sophomore years being devoted to strictly agricultural subjects.

During the junior and senior years the student continues his studies of fundamental science and learns to apply science to agriculture. He is led step by step to understand the scientific relations of every farming operation. There is so much agriculture to be taught that it becomes necessary for the student to determine which of the general lines he should emphasize most. This is made possible by numerous electives in soils, crops, agricultural economics, animal husbandry, dairy husbandry, horticulture, milling, and poultry husbandry.

STATE TEACHERS' CERTIFICATES

By the selection of proper electives in the Department of Education, the four-year curriculum in agriculture may not only lead to the degree of bachelor of science (in agriculture), but at the same time qualify the student for the three-year Kansas state teachers' certificate, renewable for life and valid in any high school or any other public school in the State. A student desiring to qualify for teaching should begin his professional preparation by electing psychology, first semester, junior year. A total of eighteen semester credits in the Department of Education is required for this certificate. These must include the following courses: psychology, educational administration, and educational psychology or educational sociology.

STATE CERTIFICATES FOR TEACHERS OF VOCATIONAL AGRICULTURE

The forty-three semester hours of electives provided in this curriculum in agriculture may be so chosen as thoroughly to prepare the student for the teaching of vocational agriculture in schools participating in the Federal Smith-Hughes funds. The following are the electives suggested for those preparing to be supervisors or teachers of vocational agriculture:

| | <i>Semester credits</i> |
|---|-------------------------|
| Professional work in education..... | 18 |
| Psychology | 3 |
| Educational Administration | 3 |
| Educational Psychology, or Educational Sociology..... | 3 |
| Methods of Teaching Agriculture..... | 3 |
| Agricultural Education | 2 |
| Electives in Education..... | 4 |
| Farm Management | 3 |
| Soil Management | 2 |
| Market Gardening, or Farm Animals in Health and in Disease..... | 3 |
| Rural Architecture | 3 |
| Agricultural Economics | 3 |
| Tractors and Trucks, or Farm Motors..... | 3 |
| Field Machinery | 2 |
| Woodwork | 2 |
| Forging | 2 |
| Concrete Construction | 2 |
| Total | 43 |

Candidates for the certificate in vocational agriculture must also have had not less than two full years of actual farm experience in labor or management, at least one of which shall have been continuous so as to give practical contact with farm conditions during all seasons.

**THE CURRICULUM IN ANIMAL HUSBANDRY AND
VETERINARY MEDICINE**

A combined curriculum in animal husbandry and veterinary medicine has been outlined so that students may receive the degree of bachelor of science in agriculture at the end of four years, and the degree of doctor of veterinary medicine at the end of two years more, thus securing both degrees in six years.

Curriculum in Agriculture

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours of recitation each week; the second shows the number of hours to be spent in laboratory work each week; and the third, where there is one, indicates the number of hours of outside work in connection with the laboratory required each week.

FRESHMAN

| FIRST SEMESTER | SECOND SEMESTER |
|---|-----------------------------|
| College Rhetoric I | College Rhetoric II |
| Engl. 101 3(3-0) | Engl. 104 3(3-0) |
| Chemistry I | Chemistry II |
| Chem. 101 5(3-6) | Chem. 102 5(3-6) |
| General Botany I | General Botany II |
| Bot. 101 3(1-4, 2) | Bot. 105 3(1-4, 2) |
| Market Grades and Classes of Live Stock | Plant Propagation |
| An. Husb. 131..... 3(1-6) | Hort. 101 3(2-3) |
| Dairy Judging | Elements of Dairying |
| Dairy Husb. 104..... 1(0-3) | Dairy Husb. 101..... 3(2-3) |
| Library Methods | Military Science II |
| Lib. Ec. 101..... 1(1-0) | Mil. Tr. 102..... 1(0-4) |
| Agricultural Lectures | Physical Education M-II |
| Gen. Agric. 101..... R(1-0) | Phys. Ed. 104..... R(0-2) |
| Military Science I | |
| Mil. Tr. 101..... 1(0-4) | |
| Physical Education M-I | |
| Phys. Ed. 103..... R(0-2) | |

SOPHOMORE

| FIRST SEMESTER | SECOND SEMESTER |
|-------------------------------------|--|
| Organic Chemistry | Quantitative Analysis I |
| Chem. 120 3(2-3) | Chem. 150 2(0-6) |
| Agricultural Physics | Principles of Feeding |
| Physics 111 3(3-0) | An. Husb. 152..... 3(3-0) |
| Anatomy and Physiology ¹ | General Zoölogy |
| Anat. 131 3(2-3) | Zoöl. 105 5(3-6) |
| Grain Crop Production | Forage Crop Production |
| Agron. 101 3(2-3) | Agron. 102 3(2-3) |
| Plant Pathology I | Breeding Types and Classes of Live Stock |
| Bot. 116 3(1-4, 2) | An. Husb. 137..... 2(0-6) |
| Farm Poultry Production | Orcharding |
| Poult. Husb. 101..... 2(1-2, 1) | Hort. 107 2(1-3) |
| Military Science III | Military Science IV |
| Mil. Tr. 103..... 1(0-4) | Mil. Tr. 104..... 1(0-4) |
| Physical Education M-III | Physical Education M-IV |
| Phys. Ed. 105..... R(0-2) | Phys. Ed. 106..... R(0-2) |

JUNIOR

| FIRST SEMESTER | SECOND SEMESTER |
|--------------------------------|--------------------------------|
| Genetics | Soil Fertility |
| An. Husb. 221..... 3(3-0) | Agron. 132 3(2-3) |
| Soils | Agricultural Journalism |
| Agron. 131 4(3-3) | Ind. Jour. 121..... 1(1-0) |
| Agricultural Microbiology | General Entomology |
| Bact. 106 3(1-6) | Ent. 101 3(2-3) |
| Electives ² 6 | Electives ² 9 |

¹ Students who do not expect to major in animal husbandry or dairy husbandry may, with the approval of the Dean of Agriculture, substitute Plant Physiology I (Bot. 208) for this course.

² Six semester credit hours of junior electives must be chosen from the work offered in history, economics, education, modern languages, or mathematics. Students preparing to teach should take not less than eleven semester credit hours of junior electives in the Department of Education.

SENIOR

FIRST SEMESTER

| | |
|------------------------------------|---------|
| Agricultural English ³ | |
| Engl. 137 | 3 (3-0) |
| Major electives ⁴ | 6 |
| Minor electives ⁵ | 4 |
| Free electives ⁶ | 3 |

SECOND SEMESTER

| | |
|---|---------|
| Agricultural Relationships ³ | |
| Gen. Agric. 201 | 1 (1-0) |
| Major electives ⁴ | 6 |
| Minor electives ⁵ | 5 |
| Free electives ⁶ | 4 |

Agricultural Electives for Students in the Curriculum in Agriculture

AGRICULTURAL ECONOMICS

FIRST SEMESTER

| | |
|----------------------|--|
| Farm Cost Accounting | |
| 2 (1-3) | |

SECOND SEMESTER

| | |
|----------------------------|--|
| Agricultural Economics | |
| 3 (3-0) | |
| Marketing and Coöperation | |
| 2 (2-0) | |
| Advanced Farm Management | |
| 3 (1-6) | |
| Agricultural Industries | |
| 2 (2-0) | |
| Agricultural Land Problems | |
| 1 (1-0) | |

| | |
|-----------------|--|
| Farm Management | |
| 3 (2-3) | |
| (Each semester) | |

Research in Agricultural Economics
(2 to 6 semester credits for graduates)

Research in Farm Management
(1 to 5 semester credits)
(Each semester, for graduates)

AGRONOMY

FIRST SEMESTER

| | |
|---|--|
| Seed Identification and Weed Control | |
| 2 (1-3) | |
| Advanced Forage Crops | |
| 2 (1-3) | |
| Advanced Soil Fertility | |
| 2 (1-3) | |
| Soil Problems | |
| 2 (1-3) | |
| Principles of Agronomic Experimentation | |
| 1 (1-0) | |
| Pasture Management | |
| 2 (1-3) | |
| Plant Genetics | |
| 3 (3-0) | |

SECOND SEMESTER

| | |
|----------------------|--|
| Crop Improvement | |
| 3 (2-3) | |
| Advanced Grain Crops | |
| 2 (1-3) | |
| Special Crops | |
| 1 (1-0) | |
| Dry-land Farming | |
| 2 (2-0) | |
| Soil Survey | |
| 2 (1-3) | |
| Agronomy Seminar | |
| 1 (1-0) | |

EACH SEMESTER

Crops Research (for graduates)
Crops Problems

Soils Research (for graduates)
Advanced Soils Laboratory

Pasture Management Research (for graduates)
(One or more semester credits each, according to work done.)

Genetics Seminar
1 (1-0)

³ The courses in Agricultural English and Agricultural Relationships are open to seniors only.

⁴ Major electives must be chosen from one department in the Division of Agriculture and approved by the head of the department.

⁵ Minor electives may be chosen from more than one department. They must be agricultural courses, or closely related science, and they must support the major work.

⁶ Students preparing to teach must use senior free electives in completing their requirements for the state teachers' certificate.

ANIMAL HUSBANDRY

FIRST SEMESTER

- Advanced Stock Judging I
2(0-6)
Form and Function in Live Stock
2(0-6)
Swine Production
3(2-3)
History of Breeds and Pedigrees
3(2-3)
Sheep Production
3(2-3)

SECOND SEMESTER

- Animal Breeding
3(3-0)
Advanced Genetics
4(3-3)
Advanced Meats
(2 to 4 semester credits)

SECOND SEMESTER

- Systems of Live-stock Production
3(3-0)
Advanced Stock Judging II
2(0-6)
Beef Cattle Production
3(2-3)
Horse Production
3(2-3)
Advanced Studies in Pedigrees
3(1-6)
Advanced Feeding
2(2-0)
The Wool Industry
3(2-3)
Live-stock Marketing
2(2-0)

EACH SEMESTER

- Meats
2(1-3)
Genetics Seminar
1(1-0)
Research in Genetics
(4 to 10 semester credits)

SUMMER SCHOOL

- Teachers' Course in Animal Husbandry
4(6-6)

DAIRY HUSBANDRY

FIRST SEMESTER

- Butter Making and Creamery Management
3(2-3)
Market Milk
2(1-3)

SECOND SEMESTER

- Dairy Inspection I
2(1-3)
Milk Production
3(3-0)
Cheese and Ice Cream Making
3(2-3)
Advanced Dairy Judging
1(0-3)
Dairy Herd Management
2(1-3)
Dairy Seminar
1(1-0)

- Dairy Research
(3 semester credits)
(Each semester, for graduates)

HORTICULTURE

FIRST SEMESTER

- Systematic Pomology
3(1-6)
Farm Forestry
4(3-3)
Practical Pomology
3(2-3)
Spraying
2(1-3)

SECOND SEMESTER

- Small Fruits
2(2-0)
Dendrology
3(1-6)
Silviculture
3(2-3)
Orchard Management
4(3-3)
Market Gardening
3(2-3)
Landscape Gardening I
4(2-6)
School Gardening
3(2-3)
Plant Materials in Landscape Gardening
3(2-3)

| | |
|--|--|
| Greenhouse Construction and Management 3(3-0) | Landscape Gardening II 3(0-9) (for graduates) |
| History and Literature of Landscape Gardening 2(2-0) | Tree Surgery 2(1-3) |
| The Theory and Aesthetics of Landscape Gardening 3(2-3) (for graduates) | City and Town Planting 3(1-6) (for graduates) |

EACH SEMESTER (for graduates)

Orchard Economics

Market Gardening Problems

Pomological Research Work

Forcing Flowers and Vegetables

(One or more semester credits each, according to work done)

MILLING INDUSTRY

FIRST SEMESTER

| |
|-----------------------------------|
| Grain Marketing 3(3-0) |
| Wheat and Flour Testing 4(1-9) |

SECOND SEMESTER

| |
|---------------------------------|
| Principles of Milling 1(0-3) |
| Grain Products 2(2-0) |
| Milling Practice I 3(1-6) |
| Milling Practice II 2(0-6) |
| Experimental Baking A 2(0-6) |

POULTRY HUSBANDRY

FIRST SEMESTER

| |
|--|
| Practice in Poultry Feeding (1 semester credit) |
| Practice in Milk Feeding (1 semester credit) |
| Poultry Breeds and Types 2(1-3) |
| Market Poultry 2(1-3) or 3(1-6) |

SECOND SEMESTER

| |
|---|
| Practice in Incubation (1 or 2 semester credits) |
| Practice in Brooding (1 to 3 semester credits) |
| Advanced Poultry Judging 1(0-3) |
| Poultry Breeding 2(0-6) |
| Poultry Farm Management 3(2-3) |
| Poultry Bacteriology 3(1-6) |
| Comparative Anatomy of Domestic Birds 3(1-6) |

BOTH SEMESTERS AND SUMMER SCHOOL

Poultry Research
(2 or more semester credits)

Electives for Agricultural Students, with Their Prerequisites

MAJOR ELECTIVES

| <i>Subject</i> | <i>Prerequisites</i> |
|--|--|
| AGRICULTURAL ECONOMICS: | |
| Agricultural Economics | Principles of Feeding, Grain Crop Production, Forage Crop Production, and Soil Fertility |
| Farm Management | Principles of Feeding, Grain Crop Production, Forage Crop Production, and Soil Fertility |
| Farm Cost Accounting..... | None |
| Marketing and Cooperation..... | Agricultural Economics |
| Advanced Farm Management..... | Farm Management |
| Agricultural Industries | Agricultural Economics, or Farm Management |
| Agricultural Land Problems..... | Agricultural Economics |
| Research in Agricultural Economics.... | Agricultural Economics |
| Research in Farm Management..... | Farm Management, and Farm Cost Accounting |

| Subject | Prerequisites |
|---|--|
| AGRONOMY: | |
| Seed Identification and Weed Control.. | Grain Crop Production, Forage Crop Production |
| Special Crops | Grain Crop Production, Forage Crop Production |
| Crop Improvement | Grain Crop Production, Forage Crop Production, Genetics |
| Advanced Grain Crops..... | Grain Crop Production |
| Advanced Forage Crops..... | Forage Crop Production |
| Principles of Agronomic Experimentation, | Crop Improvement, Soil Fertility |
| Agronomy Seminar | Grain Crop Production, Forage Crop Production, Soils |
| Pasture Management | General Botany II, Forage Crop Production |
| Plant Genetics | Genetics |
| Genetics Seminar | For prerequisites, consult instructors |
| Crop Problems | Advanced Grain Crops, Advanced Forage Crops |
| Crops Research (for graduates)..... | Advanced Grain Crops, Advanced Forage Crops |
| Pasture Management Research (for graduates) | Pasture Management, Surveying II, Ecology, Taxonomic Botany |
| Dry-land Farming | Soils |
| Advanced Soil Fertility..... | Soil Fertility |
| Soil Survey | Soils |
| Soil Problems | Soil Fertility |
| Advanced Soils Laboratory..... | Soil Fertility |
| Soils Research (for graduates)..... | Soil Fertility, Quantitative Analysis I |
| ANIMAL HUSBANDRY: | |
| Advanced Stock Judging I..... | Breeding Types and Classes of Live Stock |
| Advanced Stock Judging II..... | Advanced Stock Judging I |
| Form and Function in Live Stock..... | Advanced Stock Judging II |
| History of Breeds and Pedigrees..... | Market Grades and Classes of Live Stock |
| Beef Cattle Production..... | Breeding Types and Classes of Live Stock, Principles of Feeding |
| Swine Production | Breeding Types and Classes of Live Stock, Principles of Feeding |
| Sheep Production | Breeding Types and Classes of Live Stock, Principles of Feeding |
| Horse Production | Breeding Types and Classes of Live Stock, Principles of Feeding |
| Meats | Breeding Types and Classes of Live Stock, Principles of Feeding |
| Animal Breeding | Genetics |
| Advanced Genetics | Genetics |
| Genetics Seminar | For prerequisites, consult instructors |
| Research in Genetics..... | Advanced Genetics |
| Advanced Studies in Pedigrees..... | History of Breeds and Pedigrees |
| Advanced Feeding | Principles of Feeding |
| Advanced Meats | Meats |
| The Wool Industry..... | Sheep Production |
| Systems of Live-stock Production..... | Beef Cattle Production, Swine Production, Sheep Production, Horse Production |
| Live-stock Marketing | Beef Cattle Production, Swine Production, Sheep Production, Horse Production |
| Animal Husbandry Seminar..... | Principles of Feeding |
| DAIRY HUSBANDRY: | |
| Dairy Inspection I..... | Agricultural Microbiology, Dairy Chemistry, Elements of Dairying |
| Milk Production | Elements of Dairying, Principles of Feeding |
| Butter Making and Creamery Management | Elements of Dairying, Dairy Bacteriology |
| Cheese and Ice Cream Making..... | Elements of Dairying, Dairy Bacteriology, Dairy Chemistry |
| Market Milk | Elements of Dairying, Dairy Bacteriology |
| Advanced Dairy Judging..... | Dairy Judging |
| Dairy Herd Managemnt..... | Milk Production |
| Dairy Seminar | Elements of Dairying, Dairy Inspection I, Milk Production |
| Dairy Research (for graduates)..... | Milk Production, Butter Making and Creamery Management |
| HORTICULTURE: | |
| Systematic Pomology | None |
| Small Fruits | Plant Propagation |
| Farm Forestry | None |
| Dendrology | None |

Subject

Prerequisites

MAJOR ELECTIVES—concluded

| | |
|---|--|
| Silviculture | Farm Forestry or Dendrology |
| Gardening | None |
| Landscape Gardening I..... | None |
| Greenhouse Construction and Manage- ment | None |
| School Gardening | None |
| Practical Pomology | Systematic Pomology |
| Orchard Management | None |
| Spraying | Chemistry II |
| Market Gardening | None |
| History and Literature of Landscape Gardening | None |
| Plant Materials of Landscape Garden- ing | Plant Propagation |
| Tree Surgery | Plant Physiology I |
| Landscape Gardening II (for graduates) | Landscape Gardening I |
| Theory and Aesthetics of Landscape Gardening (for graduates)..... | History and Literature of Landscape Gardening |
| City and Town Planting (for graduates), Orchard Economics (for graduates)... | None |
| Market Gardening Problems (for graduates) | For prerequisites, consult instructors |
| Pomological Research Work (for graduates) | For prerequisites, consult instructors |
| Forcing Fruits and Vegetables (for graduates) | For prerequisites, consult instructors |

MILLING INDUSTRY:

| | |
|------------------------------|--|
| Principles of Milling..... | None |
| Grain Marketing | Grain Crop Production |
| Grain Products | Grain Marketing |
| Milling Practice I..... | Principles of Milling |
| Milling Practice II..... | Milling Practice I |
| Wheat and Flour Testing..... | Grain Products, Organic Chemistry, and Advanced Quantitative Analysis |
| Experimental Baking A..... | Wheat and Flour Testing |

POULTRY HUSBANDRY:

| | |
|--|--|
| Practice in Poultry Feeding..... | Farm Poultry Production |
| Practice in Incubation..... | Farm Poultry Production |
| Practice in Brooding..... | Farm Poultry Production |
| Practice in Milk Feeding..... | Farm Poultry Production |
| Poultry Breeds and Types..... | None |
| Advanced Poultry Judging..... | Poultry Breeds and Types |
| Market Poultry | Farm Poultry Production |
| Poultry Breeding | Genetics |
| Poultry Farm Management..... | Farm Management |
| Poultry Bacteriology | Microbiology |
| Poultry Anatomy | Anatomy and Physiology |
| Comparative Anatomy of Domestic Birds, | Embryology |
| Poultry Research | Farm Poultry Production, Practice in Poul- try Feeding, Practice in Incubation, and Practice in Brooding |

OTHER ELECTIVES

ANATOMY AND PHYSIOLOGY:

| | |
|-------------------|-------------|
| Anatomy I | None |
| Anatomy II | Anatomy I |
| Anatomy III | Anatomy II |
| Anatomy IV | Anatomy III |

APPLIED MECHANICS:

| | |
|---------------------------|------|
| Engineering Drawing | None |
|---------------------------|------|

BACTERIOLOGY:

| | |
|----------------------------|---------------------------|
| Soil Microbiology | Agricultural Microbiology |
| Dairy Bacteriology | Agricultural Microbiology |
| Poultry Bacteriology | Agricultural Microbiology |

BOTANY:

| | |
|--|--------------------|
| Plant Physiology I..... | General Botany II |
| Taxonomic Botany | General Botany II |
| Field Crops and Vegetable Diseases.... | Plant Pathology I |
| Fruit Crop Diseases..... | Plant Pathology I |
| Economic Botany | General Botany II |
| Plant Pathology II..... | Plant Pathology I |
| Plant Pathology III..... | Plant Pathology II |

| <i>Subject</i> | <i>Prerequisites</i> |
|---|--|
| CHEMISTRY: | |
| Advanced Inorganic Chemistry..... | Chemistry II |
| Inorganic Preparations | Chemistry II |
| Organic Chemistry I..... | Chemistry II |
| Organic Chemistry II..... | Organic Chemistry I |
| Organic Preparations | Organic Chemistry II |
| Principles of Animal Nutrition..... | Organic Chemistry |
| Physiological Chemistry | Organic Chemistry |
| Physical Chemistry | Quantitative Analysis |
| Quantitative Analysis II..... | Chemistry II |
| Quantitative Analysis III..... | Quantitative Analysis II |
| Chemistry of Soils and Fertilizers..... | Quantitative Analysis I |
| Chemistry of Plant Products..... | Quantitative Analysis I, Organic Chemistry |
| Chemistry of Dairy Products..... | Quantitative Analysis I, Organic Chemistry |
| Chemistry of Meats..... | Quantitative Analysis I, Organic Chemistry |
| Research in Agricultural Chemistry.... | (Depends upon work undertaken) |
| CIVIL ENGINEERING: | |
| Surveying I | Trigonometry |
| Surveying II | Surveying I |
| Elements of Irrigation and Drainage.. | None |
| ECONOMICS AND SOCIOLOGY: | |
| Economics | None |
| Sociology | None |
| Rural Sociology | None |
| Business Organization | Economics |
| Labor Problems | Economics |
| Money and Banking..... | Economics |
| Public Finance | Economics |
| Business Management | Economics |
| Current Economic Problems..... | Economics |
| Social Problems | Sociology or Economics |
| Community Problems | Sociology or Economics |
| EDUCATION: | |
| Psychology | None |
| Educational Administration I..... | None |
| Educational Psychology | Psychology |
| Educational Sociology I..... | None |
| Agricultural Education | Educational Administration I |
| Special Methods in the Teaching of Agriculture | Educational Psychology |
| Rural Education | Educational Administration I |
| Supervised Observation and Teaching in Agriculture | Educational Psychology |
| ELECTRICAL ENGINEERING: | |
| Electrical Engineering C..... | College Physics |
| Illuminating Engineering | College Physics |
| ENGLISH: | |
| Argumentation and Debate..... | College Rhetoric II |
| Oral English I..... | College Rhetoric II |
| Farm Advertising | College Rhetoric II |
| Farm Bulletins | College Rhetoric II |
| ENTOMOLOGY: | |
| Apiculture | General Entomology |
| Milling Entomology | General Entomology |
| Horticultural Entomology | General Entomology |
| General Economic Entomology..... | General Entomology |
| Insect Morphology I..... | General Entomology |
| FARM ENGINEERING: | |
| Rural Architecture | None |
| Field Machinery | None |
| Tractors and Trucks..... | None |
| Farm Motors | None |
| Power Machinery | Field Machinery |
| Advanced Farm Machinery..... | Power Machinery |
| Farm Machinery Research..... | Power Machinery |
| Farm Equipment | None |
| Farm Sanitation and Water Supply.... | None |
| FRENCH: | |
| French I | None |
| Beginning French I..... | None |
| French II | French I |
| Beginning French II..... | Beginning French I |
| French Readings | French II |
| French Short Stories..... | French Readings |

Subject

Prerequisites

GEOLOGY:

| | |
|-------------------------------------|--------------------------------|
| Dynamic and Structural Geology..... | None |
| Engineering Geology | None |
| Historical Geology | Dynamic and Structural Geology |

GERMAN:

| | |
|---------------------------|---------------------------------|
| German I | None |
| Beginning German I..... | None |
| German II | German I |
| Beginning German II..... | Beginning German I |
| German Readings | German II or Beginning German I |
| German Comedies | German Readings |
| German Short Stories..... | German Readings |
| Scientific German I..... | German II or Beginning German I |
| Scientific German II..... | Scientific German I |

HISTORY AND CIVICS:

| | |
|------------------------------------|----------------|
| American History I..... | None |
| American History II..... | None |
| American History III..... | None |
| American Agricultural History..... | None |
| American Industrial History..... | None |
| American Political History..... | None |
| Pan-America | None |
| Modern Europe | None |
| Current History | None |
| American Government | None |
| Comparative Government | None |
| Business Law I..... | None |
| Business Law II..... | Business Law I |
| Farm Law | None |

INDUSTRIAL JOURNALISM:

| | |
|---------------------------------|--|
| Elementary Journalism | None |
| Industrial Writing | Elementary Journalism or Agricultural Journalism |
| Industrial Feature Writing..... | Industrial Writing |
| Journalism Practice I..... | May be taken with Agricultural Journalism |
| Journalism Practice II..... | Journalism Practice I |

MATHEMATICS:

| | |
|-----------------------------|---|
| Plane Trigonometry | Plane Geometry, and 1½ units of high-school algebra |
| College Algebra | Plane Geometry, and 1½ units of high-school algebra |
| Analysis of Statistics..... | None |

PATHOLOGY:

| | |
|-----------------------|--|
| Histology I..... | None |
| Histology II | Histology I |
| Pathology I | Histology II, Comparative Physiology II, Pathogenic Bacteriology I |
| Pathology II | Pathology I |
| Meat Inspection | Consult instructor |

PHYSICS:

| | |
|-------------------------|-------------------|
| General Physics I..... | Trigonometry |
| General Physics II..... | General Physics I |
| Photography | None |

SHOP PRACTICE:

| | |
|--------------------------------------|---------------------------------|
| Woodwork I | None |
| Woodwork II | Woodwork I |
| Woodwork III | Woodwork II |
| Woodworking for Grammar Grades..... | None |
| Woodworking I for High Schools..... | Woodworking for Grammar Grades |
| Woodworking II for High Schools..... | Woodworking I for High Schools |
| Wood Turning | Woodworking II for High Schools |
| Farm Shop Practice..... | None |
| Farm Woodwork | None |
| Forging I | None |
| Forging II | Forging I |

SPANISH:

| | |
|------------------------|------------|
| Spanish I | None |
| Spanish II | Spanish I |
| Spanish Readings | Spanish II |

STEAM AND GAS ENGINES:

| | |
|---------------------------|------|
| Dairy Refrigeration | None |
|---------------------------|------|

| <i>Subject</i> | <i>Prerequisites</i> |
|---|--|
| SURGERY AND MEDICINE: | |
| Surgery I | None |
| Surgery II | Surgery I |
| Horseshoeing | Anatomy and Physiology |
| Obstetrics | Anatomy and Physiology, Embryology |
| Farm Animals in Health and in Disease | Anatomy and Physiology |
| ZOOLOGY: | |
| Embryology | General Zoölogy |
| Parisitology | General Zoölogy |
| Economic Zoölogy | General Zoölogy |
| Advanced Invertebrate Zoölogy..... | General Zoölogy |
| Advanced Vertebrate Zoölogy..... | General Zoölogy |
| Taxonomy of Invertebrates..... | General Zoölogy, Principles of Taxonomy |
| Taxonomy of Vertebrates..... | General Zoölogy, Principles of Taxonomy |
| Animal Ecology | General Zoölogy, General Entomology |
| Cytology | Embryology and Physiology, or Embryology |
| Evolution and Heredity..... | Consult instructor |

Curriculum in Animal Husbandry and Veterinary Medicine*

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

Freshman year of the Curriculum in Agriculture

SOPHOMORE

| FIRST SEMESTER | SECOND SEMESTER |
|---|---|
| Organic Chemistry Chem. 120 3(2-2, 1) | Quantitative Analysis I Chem. 150 2(0-6) |
| General Zoölogy Zoöl. 105 5(3-6) | Pathogenic Bacteriology I Bac. 111 4(2-6) |
| Anatomy I Anat. 101 6(3-9) | Anatomy II Anat. 106 7(3-12) |
| Grain Crop Production Agron. 101 3(2-2, 1) | Forage Crop Production Agron. 102 3(2-2, 1) |
| Military Science III Mil. Tr. 103 1(0-4) | Agricultural Journalism Ind. Jour. 121..... 1(1-0) |
| Physical Education M-III Phys. Ed. 105..... R(0-2) | Military Science IV Mil. Tr. 104..... 1(0-4) |
| | Physical Education M-IV Phys. Ed. 106..... R(0-2) |

JUNIOR

| FIRST SEMESTER | SECOND SEMESTER |
|---|--|
| Embryology Zoöl. 117 3(2-3) | Principles of Feeding An. Husb. 152..... 3(3-0) |
| Anatomy III Anat. 111 5(1-12) | Anatomy IV Anat. 116 3(1-6) |
| Histology I Path. 101 3(1-6) | Histology II Path. 106 3(1-6) |
| General Entomology Ent. 101 3(2-3) | Electives† 7 |
| Electives† 3 | |

* This curriculum is so arranged that students may receive the degree of bachelor of science (in agriculture) at the end of four years, and the degree of doctor of veterinary medicine at the end of two more years.

† Six semester credit hours of junior electives must be chosen from the work offered by the departments of history, economics, education, modern languages, or mathematics.

SENIOR

FIRST SEMESTER

| | |
|--------------------------|--------|
| Genetics | • |
| An. Husb. 221..... | 3(3-0) |
| Comparative Physiology I | |
| Anat. 121 | 5(4-3) |
| Soils | |
| Agron. 131 | 4(3-3) |
| Agricultural English | |
| Engl. 137 | 3(3-0) |
| Electives | 1 |

SECOND SEMESTER

| | |
|----------------------------|-----------|
| Agricultural Relationships | |
| Gen. Agric. 201..... | 1(1-0) |
| Soil Fertility | |
| Agron. 132 | 3(2-2, 1) |
| Comparative Physiology II | |
| Anat. 126 | 3(2-3) |
| Materia Medica I | |
| Surg. 151 | 2(2-0) |
| Electives | 7 |

FIFTH YEAR

Junior year of the Curriculum in Veterinary Medicine

SIXTH YEAR

Senior year of the Curriculum in Veterinary Medicine

Agricultural Economics

Professor _____
Associate Professor GRIMES

Assistant Professor THOMSEN
Assistant FRENCH

The realization of a more profitable agriculture depends as much upon the utilization of sound business principles, management and methods as upon the practice of technical knowledge emphasized in other departments of an agricultural college. The business side of farming deals essentially with two important groups of forces and conditions, which may be classified, on the one hand, as those centering about the individual and his particular farm, while on the other hand are those having to do largely with group activities and relationships operating from within the locality as well as from outside regions. Local, state, and federal governments in their relations to farmers, middlemen and consumers have a definite part in programs of modern agriculture. The farmer makes relatively large or small profits according to the degree of his personal efficiency in the organization and management of the farm and the marketing of its products. The courses in this department are therefore designed to equip the student with principles and facts, and the habits of clear thinking which will lead to more efficient and profitable farming both for the individual and for the community.

The department engages not only in teaching, but also conducts investigations of the various economic problems of agriculture. A number of studies have been completed, others are being conducted, and many more are contemplated for the future. These studies provide ample material for class work and present opportunities for advanced students to engage in original investigation and research. Farm credit, tenancy, the marketing of farm products, and other subjects, together with special farm-management investigations, center the student's attention on facts which are up-to-date and of vital importance to those who desire to make their farming profitable and interesting.

Farm-management studies have been made in many parts of the State, and are being extended each year. These studies of the farm business furnish abundant material for class and laboratory work, and

give an excellent knowledge of the business problems of individual farmers in the various parts of the State. A number of the more successful farms of the State are visited by the students in the advanced courses in farm management. These farms furnish the student an opportunity to study the personality of the farmer as well as his business methods and results.

COURSES IN AGRICULTURAL ECONOMICS

FOR UNDERGRADUATES

101.* AGRICULTURAL ECONOMICS. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: An. Husb. 152, and Agron. 101, 102, and 132. In case student desires, Agricultural Economics may be taken along with Agron. 132. Professor ——— and Associate Professor Grimes.

Clear thought and sound judgment upon the problems that confront the individual are essential to success in any phase of agricultural production. The course in agricultural economics undertakes to familiarize the student with the economic principles and forces with which every farmer must deal. The relative profitability of farm enterprises, the proportion in which the factors of production should be combined for optimum results, and other phases of production are followed by the laws of values and the important questions connected with the exchange of farm products and the ultimate distribution of farm wealth. The course is conducted by lectures, texts, and supplementary reading. Texts: Taylor's *Agricultural Economics* and Ely and Wicker's *Elementary Principles of Economics*.

106. FARM MANAGEMENT. Elective, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Agron. 101, 102, and 132, and An. Husb. 152. Associate Professor Grimes.

The economic factors affecting the organization and operation of the farm business are studied with respect to their effect on the profits from farming enterprise. Discussions and problems are confined chiefly to the economic problems of the individual farmer on his farm. Methods of leasing are studied in their effect upon the opportunities of the tenant and the landlord. Results from actual farms are studied in the laboratory to give the student opportunity to observe the effects of the various economic factors in their influence on the farm business.

111. FARM COST ACCOUNTING. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Associate Professor Grimes.

Various systems of farm records and accounts are studied to acquaint the student with the more practical methods. The principles of cost finding as applied to agricultural enterprises are given. The laboratory work affords opportunity to work out problems from actual farms in which these principles are involved. Particular attention is given to determining the cost of producing farm products and to the analysis and utilization of cost of production data.

FOR GRADUATES AND UNDERGRADUATES

201. MARKETING AND COÖPERATION. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Ag. Ec. 101. Professor ———.

American farmers' organizations have attempted much in the way of reorganizing the process by which agricultural products are transferred

* For an explanation of the system used in numbering courses, see the paragraph on "Course Numbers," given elsewhere in this catalogue.

from the farm to the consumer as well as in the bettering of farmers as a class. Knowledge of their experience in coöperative undertakings, whether in the line of marketing or production, is essential to a thorough understanding of the situation regarding farmers' coöperative organizations and the problems of greater economy in marketing. Following the sketch of the important farmer movements, speculation, market organization, coöperative production, exchange and credit are studied in detail. The course consists of lectures, special topics, assigned readings, and discussions. Text: Weld's *The Marketing of Farm Products*.

206. ADVANCED FARM MANAGEMENT. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Ag. Ec. 106. Associate Professor Grimes.

The factors affecting the successful organization and operation of the farm businesses are studied by visiting farms in various parts of the State. The effects of external factors are also observed. A number of the better and more profitable farms in Kansas are visited during the course.

211. AGRICULTURAL INDUSTRIES. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Ag. Ec. 101 or 106. Dean Farrell.

This course deals with some of the more important phases of agriculture from the standpoint of their industrial requirements and relationships. Consideration is given to the principal geographic, economic, and social factors involved in the establishment and maintenance of the world's leading agricultural industries. The course is designed primarily to fit students to make an agricultural reconnaissance either in a settled or unsettled region; to determine what agricultural industries are suitable for a region; and to devise methods of establishing new agricultural industries or of improving industries already established. The course consists of lectures, reference work, assigned topics, and discussions.

216. AGRICULTURAL LAND PROBLEMS. Elective, second semester. Class work, one hour. One semester credit. Prerequisite: Ag. Ec. 101. Professor ———.

The practical exhaustion of free land, rising prices, increasing tenancy and declining soil fertility have produced unusual interest in land problems. The conditions essential to the best productive use of land, together with the various attempts in different countries to promote the proper use of land by various land policies, provide the basis for the development of helpful views respecting land reforms which are now pressing for public recognition. The course consists of lectures, reference work, assigned topics, and discussions.

FOR GRADUATES.

301. RESEARCH IN AGRICULTURAL ECONOMICS. Elective, both semesters. Credit to be based on the quality and quantity of the work accomplished. Prerequisite: Ag. Ec. 101. Professor ———.

This course is open only to a limited number of advanced students. A study is made of the economic problems of immediate interest to the farmers of Kansas. The facts and the processes of present marketing systems must be known before intelligent changes in them can be suggested. The forces causing undesirable tenancy must be determined before the evils can be eradicated. These subjects and many others are topics for careful research in this course.

306. RESEARCH IN FARM MANAGEMENT. Elective, both semesters and summer school. Laboratory, three to fifteen hours. One to five semes-

ter credits. Prerequisites: Ag. Ec. 106 and 111. Associate Professor Grimes.

Students are assigned special farm-management problems. The completion of the work entitles them to credit according to the amount of work done.

Agronomy

Professor CALL
 Professor SALMON
 Professor THROCKMORTON
 Associate Professor PARKER
 Associate Professor HENSEL
 Associate Professor CUNNINGHAM

Assistant Professor SEWELL
 Assistant Professor ZAHNLEY
 Instructor SCOTT
 Assistant WILSON
 Assistant HARLING
 Assistant PHINNEY

The College farm used by the Department of Agronomy comprises 320 acres of medium rolling upland soil, well suited to experimental and demonstration work. It is well equipped with all kinds of farm machinery necessary in crop production. The general fields and experimental plots used for the breeding and testing of farm crops, and for conducting experiments in soil fertility and methods of culture, afford the student excellent opportunities for study and investigation.

Large and well-equipped laboratories for soil and crop work are maintained for the regular use of students. Material is provided for the study of the grain and forage crops best adapted to different purposes and most suitable for growing in the State. Ample greenhouse space is provided for germinating seeds under varying conditions, and for research work in soils during the winter months.

The Department of Agronomy offers courses in cereal and forage crop production and improvement in pasture management, in soils, soil fertility, soil survey, and dry-land farming.

COURSES IN FARM CROPS

FOR UNDERGRADUATES

101. GRAIN CROP PRODUCTION. Sophomore year, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Bot. 101. Associate Professor Parker and Assistant Professor Zahnley.

This course is a study of the distribution, relative importance, and production of grain crops, including wheat, corn, oats, barley, rye, rice, buckwheat, and flax.

102. FORAGE CROP PRODUCTION. Sophomore year, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Bot. 101. Assistant Professor Zahnley.

This course is a study of the distribution, relative importance, value, and production of forage crops, including sorghums, alfalfa, clover, and the grasses.

103. FARM CROPS. Sophomore year, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Assistant Professor Zahnley.

This course consists of a study of the more important grain and forage crops, especially from the production viewpoint.

105. SEED IDENTIFICATION AND WEED CONTROL. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Agron. 101 and 102. Assistant Professor Zahnley and Mrs. Harling.

Methods of propagation, control, and eradication of weeds are discussed in lectures. The laboratory period is devoted to the identification of weed plants, and seeds; to germination and purity testing; and to field trips.

106. SPECIAL CROPS. Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Agron. 101 and 102. Assistant Professor Zahnley.

The distribution, climatic and soil requirements, relative importance, and production of sugar beets, cotton, flax for fiber, hemp, tobacco, and other minor crops are studied.

FOR GRADUATES AND UNDERGRADUATES

201. CROP IMPROVEMENT. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Agron. 101 and 102, and An. Husb. 221. Associate Professor Parker.

This course reviews the principles of plant breeding and applies them to the principal groups of field crops. Methods of selection, hybridization, and breeding for special qualities are discussed. Laboratory work is a study of heritable characters and of their behavior in several generations following the cross.

202. ADVANCED GRAIN CROPS. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 101. Professor Salmon.

Special phases of grain crop production are discussed in class. The laboratory work is devoted largely to identification and judging of threshed grain.

203. ADVANCED FORAGE CROPS. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite, Agron. 102. (Not offered until 1921) Assistant Professor Zahnley.

Results of the most recent investigations carried on with forage crops in this and in other countries are studied, together with a more intensive study of the sorghums, alfalfa, sweet clover, soybeans, and other important or promising forage crops.

Laboratory.—The laboratory work is devoted to a study of the growth habits of the crops considered in the lecture, especially as they are related to the production and improvement of these crops. Storing, market grading, and marketing of hay are also considered.

205. PRINCIPLES OF AGRONOMIC EXPERIMENTATION. Elective, first semester. Class work, one hour. One semester credit. Prerequisites: Agron. 201 and 132. Professor Salmon.

A discussion of the principles of experimentation in general is followed by their application to agronomic problems. Important contributions to agronomic science are studied from the historical viewpoint.

206. AGRONOMY SEMINAR. Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Agron. 101, 102, and 131. Professor Call.

In this course students are required to review before the class timely articles appearing in bulletins and current periodicals.

207. PASTURE MANAGEMENT. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Bot. 102 and Agron. 102. Associate Professor Hensel.

This course will be taken up in two parts: First, native forage plants, their distribution, value, life history and habits, and their management. Second, management of pastures and ranges, including the determination of carrying capacity, character of stock best suited to a range or pasture and the proper methods of handling areas to maintain or increase the forage cover.

208. PLANT GENETICS. Elective, first semester (not offered until fall of 1921). Class work, three hours. Three semester credits. Prerequisite: An. Husb. 221. Associate Professor Parker.

This course is an advanced course in genetics and is offered to those students interested in plant breeding. Lectures and reference reading will deal with fundamental principles of breeding as they have been worked out in plants.

209. GENETICS SEMINAR. Elective, first and second semesters. One semester credit. (For prerequisites, consult instructors.) Associate Professor Parker and Assistant Professor Ibsen.

This course continues through the first and second semesters and includes the study and criticism of genetic experiments in plants and animals, the biological and mathematical methods employed, and the validity of conclusions drawn.

210. CROP PROBLEMS. Elective, both semesters and summer school. Laboratory, three to twelve hours. One to four semester credits. Prerequisites: Agron. 202 and 203. Professor Salmon and Associate Professor Parker.

Students choose or are assigned special problems for study. The completion of the work with a written report entitles them to credit according to the amount and quality of the work done.

FOR GRADUATES

301. CROPS RESEARCH. Elective, both semesters and summer school. Laboratory, three to fifteen hours. One to five semester credits according to the work done. Prerequisites: Agron. 202 and 203. Professor Salmon and Associate Professor Parker.

Students choose or are assigned special problems for investigation. The completion of the work entitles them to credit according to the amount of work done.

302. PASTURE MANAGEMENT RESEARCH. Elective, both semesters and summer school. One to five semester credits, depending on the work done. Prerequisites: Agron. 207, Civ. Eng. 111, Bot. 223 and 225. Associate Professor Hensel.

Students choose or are assigned special problems for investigation.

COURSES IN SOILS

FOR UNDERGRADUATES

131. SOILS. Junior and senior years, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: Chem. 102. Professor Call, Professor Throckmorton, Assistant Professor Sewell, and Mr. Scott.

This course deals with the origin and formation of soils and their classification and composition as influenced by method of formation and climatic condition. Special attention is given to the management of soils required to conserve moisture and liberate plant food.

132. SOIL FERTILITY. Junior and senior years, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Chem. 150 and Agron. 131. Professor Call, Professor Throckmorton, Assistant Professor Sewell, and Mr. Scott.

Factors influencing the fertility of the soil, the effect of different systems of farming on soil fertility, and management of the soil to conserve its fertility receive most attention in this course.

FOR GRADUATES AND UNDERGRADUATES

231. DRY-LAND FARMING. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Agron. 131. Professor Throckmorton.

The principles underlying the cultivation methods and farming systems under light rainfall conditions are studied.

232. ADVANCED SOIL FERTILITY. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 132. Professor Throckmorton.

This course deals with the use of commercial fertilizers and their effects upon plants and soil.

233. SOIL SURVEY. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 131. Professor Throckmorton, and Mr. Scott.

Types of soils of the United States and methods of mapping soil areas are studied in this course. Special attention is given to the study of Kansas soils in the field.

234. SOIL PROBLEMS. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 132. Professor Throckmorton.

This course deals with the management of soils under irrigation and with the management of wet, sandy, and eroded soils and with other types requiring special methods of working.

235. ADVANCED SOILS LABORATORY. Elective, first and second semester, or both. One to four semester credits, according to the amount of work done. Prerequisites: Agron. 131 and 132. Professor Throckmorton and Mr. Scott.

This course deals with the more advanced problems of soil physics and fertility and includes the making of mechanical analyses, the determination of moisture equivalent, specific heat, and pot work with soils in the greenhouse.

FOR GRADUATES

331. SOILS RESEARCH. Elective, both semesters and summer school. Laboratory, three to fifteen hours. One to five semester credits, according to the work done. Prerequisites: Agron. 132 and Chem. 150. Professors Call and Throckmorton and Assistant Professor Sewell.

Students are assigned special soil problems. The completion of the work entitles them to credit according to the amount of work done.

Animal Husbandry

Professor McCAMPBELL
Associate Professor BELL
Associate Professor FERRIN
Associate Professor PATERSON
Assistant Professor IBSEN

Assistant Professor WINCHESTER
Instructor AUBEL
Instructor ZIMMERMAN
Assistant _____
Assistant _____

The Department of Animal Husbandry owns 400 acres of land, and rents 256 acres for the maintenance of herds and flocks of pure-bred horses, cattle, sheep, and hogs. The College live stock has attained a national reputation among breeders and feeders on account of the many prize-winning animals produced.

The feedyards and barns are well arranged for experimental feeding and the maintenance of the herds. The laboratory of the animal husbandry student is, as a matter of fact, the feedyard and the animal. He

studies the animal from the standpoint of the breeder and of the feeder. He learns to combine the needs of each and to find these qualities exemplified in the perfect animal.

The courses of study in this department are arranged to give the student special instruction in the selection, breeding, feeding, marketing, and management of all classes of live stock. Attention is also given to the sanitary conditions and treatment of the more common forms of disease to which the animals are subject.

COURSES IN ANIMAL HUSBANDRY

FOR UNDERGRADUATES

131. MARKET GRADES AND CLASSES OF LIVE STOCK. Freshman year, first semester. (Also given in second semester and in summer school.) Class work, one hour; laboratory, six hours. Three semester credits. Associate Professor Ferrin, Associate Professor Paterson, Mr. Aubel, and Mr. Zimmerman.

This course consists of a study of the market types and classes of horses, cattle, sheep, and swine. Text: Vaughn's *Types and Market Classes of Live Stock*.

Laboratory.—Practice is given in scoring and judging market animals.

134. TYPES AND CLASSES OF LIVE STOCK (Vet.). Sophomore year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Associate Professor Ferrin.

One-fourth of this course is given by members of the Dairy Husbandry Department. A study is made of the market types and classes of horses, beef cattle, dairy cattle, sheep, and swine. Text: Vaughn's *Types and Market Classes of Live Stock*.

Laboratory.—Practice is given in scoring and judging market animals.

137. BREEDING TYPES AND CLASSES OF LIVE STOCK. Sophomore year, second semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 131. Associate Professor Ferrin, Associate Professor Paterson, and Mr. Aubel.

This course consists of a study of the breeding types and classes of horses, cattle, sheep, and swine. Text: Plumb's *Types and Breeds of Farm Animals*.

Laboratory.—Practice is given in scoring and judging breeding animals.

140. ADVANCED STOCK JUDGING I. Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 137. Associate Professor Bell.

This course deals with the judging of market classes as well as with all different breeds of pure-bred stock. The stock is judged in groups of from four to six animals in the same manner as is customary at county or state fairs.

143. ADVANCED STOCK JUDGING II. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 140. Associate Professor Bell.

This is a continuation of An. Husb. 140. During the work of the semester occasional trips are made to the best live-stock farms of the State, where the students have an opportunity to judge and to observe the management of herds and flocks as handled by the most successful stockmen of the State.

146. FORM AND FUNCTION IN LIVE STOCK. Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 143. Associate Professor Bell.

A detailed and specific study is made of animal form and type, and influence of type upon function; also of the relation of form, type, and condition to growth and development. Comparative measurements are taken of growing and fattening animals, speed and draft horses, mutton and wool sheep, and lard and bacon types of hogs. Special training is given in presenting orally the relative merits of animals of all breeds.

149. HISTORY OF BREEDS AND PEDIGREES. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: An. Husb. 131. Mr. Zimmerman.

A study is made of the early history and development of pure-bred domestic animals; also a sufficient study of herdbooks and pedigrees to acquaint students with the leading strains and families of the different breeds of horses, cattle, sheep, and swine. Text: Plumb's *Types and Breeds of Farm Animals*.

152. PRINCIPLES OF FEEDING. Sophomore year, second semester. (Also given in summer school.) Class work, three hours. Three semester credits. Prerequisites: Anat. 131, and Chem. 120. Associate Professor Ferrin.

This course involves a study of the digestive system and the processes of nutrition, the origin, chemical analysis, grades, and feeding values of different feeds, and of the theory of practical economy of rations, both for the maintenance and for the fattening of all classes of farm animals.

155. BEEF CATTLE PRODUCTION. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 137 and 152. Professor McCampbell.

This course includes the study of economical methods of growing and fattening market cattle and up-to-date methods of breeding, developing, fitting, and marketing pure-bred beef cattle. The laboratory includes practice in feeding, management, and housing of cattle.

158. SWINE PRODUCTION. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 137 and 152. Associate Professor Ferrin.

This course comprises a systematic study of economical methods of growing, fitting, and finishing swine both for breeding purposes and for the market. The laboratory work includes practice in feeding, management, and housing of swine.

161. SHEEP PRODUCTION. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 137 and 152. Associate Professor Paterson.

A systematic study is made of economic methods of growing, fitting, and finishing sheep both for breeding purposes and for market. The laboratory work includes practice in feeding, management, and housing of sheep.

164. HORSE PRODUCTION. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 137 and 152. Associate Professor Bell.

This course includes a study of economic methods of growing, handling, and housing horses for breeding purposes, for work, and for the market. The laboratory work includes practice in feeding, handling, and housing horses.

167. MEATS. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: An. Husb. 137 and 152. Associate Professor Paterson.

This is a course in killing, and in dressing, cutting, and curing meats.

170. TEACHERS' COURSE IN ANIMAL HUSBANDRY. Elective, summer school. Class work, six hours; laboratory, six hours. Four semester credits. Professor McCampbell.

This course is planned to give a general review of the live-stock industry, with the purpose of encouraging a better standard of teaching animal husbandry in secondary schools. The course includes work in feeding, breeding, management, and history of the various breeds of live stock.

FOR GRADUATES AND UNDERGRADUATES

221. GENETICS. Elective, first or second semester; also, summer school. Class work, three hours. Three semester credits. Prerequisites: Zoöl. 105, and Bot. 105. Assistant Professor Ibsen.

This course embraces a general discussion of variation, Mendelian inheritance, and related subjects.

223. ANIMAL BREEDING. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: An. Husb. 221. Mr. Aubel.

This course embraces a study of the physiology of reproduction; general principles of heredity; variation; systems of mating; influence of pedigrees and herdbook standards; and an analysis of the breeding practices of leading breeders.

225. ADVANCED GENETICS. Elective, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisites: An. Husb. 221. Assistant Professor Ibsen.

Particular attention is given to the relation of the chromosomes to heredity. The subject as a whole is studied in greater detail than in An. Husb. 221.

227. GENETICS SEMINAR. Elective, first and second semester. One semester credit. (For prerequisites, consult instructors.) Associate Professor Parker and Assistant Professor Ibsen.

This course continues through the first and second semesters and includes the study and criticism of genetic experiments in plants and animals, the biological and mathematical methods employed, and validity of conclusions drawn.

229. RESEARCH IN GENETICS. Elective, first and second semesters. Four to ten semester credits. Prerequisite: An. Husb. 225. Assistant Professor Ibsen.

This course continues through the year and offers opportunity for individual study of problems in which small mammals are used as the experimental animals.

231. ADVANCED STUDIES IN PEDIGREES. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: An. Husb. 149. Professor McCampbell.

This course consists of a careful study of the pedigrees and the prepotency of individuals representing the more important strains and families of beef cattle, horses, sheep, and swine.

233. ADVANCED FEEDING. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: An. Husb. 152. Associate Professor Ferrin.

This course consists of a survey of the experimental feeding of horses, cattle, sheep, and hogs, together with a study of the fundamental and practical feeding problems of the various sections of the country. Emphasis is placed upon the results obtained in the experimental investigation of these problems.

235. ADVANCED MEATS. Elective, second semester. Two to four semester credits. Prerequisite: An. Husb. 167. Associate Professor Paterson.

This course includes grading of carcasses, studies in nutritive values of different grades of meats, factors influencing the quality of meats, factors influencing dressing percentage of meat animals, and the identification of meats from different animals.

237. THE WOOL INDUSTRY. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: An. Husb. 161. Associate Professor Paterson.

This course includes a study of the supply of wool and the demand for it, and the method of producing, marketing, storing, grading, and manufacturing wool.

239. SYSTEMS OF LIVE-STOCK PRODUCTION. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: An. Husb. 155, 158, 161, and 164. Professor McCampbell.

This course includes a study of the relation of live-stock production to agriculture. It also includes a study of management, climate, soil, topography, location of markets, land, labor, capital, and managing ability as factors influencing the choice and adaptation of systems of production.

241. LIVE-STOCK MARKETING. Elective, second semester. Class work, two hours. Two semester credits. Prerequisites: An. Husb. 155, 158, 161, and 164. Professor McCampbell and Assistant Professor Winchester.

This course includes a study of the art of marketing live stock and live-stock products; freight and insurance rates in transit, liability of carrier and shipper, terminal charge, etc.; commissions for sale of storage; the relation of market prices of grain and hay to contemporary values of live-stock meat.

243. ANIMAL HUSBANDRY SEMINAR. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: An. Husb. 152. Professor McCampbell and Assistant Professor Winchester.

FOR GRADUATES

301. RESEARCH IN ANIMAL HUSBANDRY. Elective, first and second semesters. Prerequisites: An. Husb. 155, 158, 161, and 164. Six to sixteen semester credits. Professor McCampbell.

Students are assigned special problems for investigation.

Dairy Husbandry

Professor FITCH
Assistant Professor CAVE
Assistant Professor OLSON

Instructor ATKESON
Assistant HUFFMAN

The College dairy farm, including the building and yards, consists of 160 acres of medium upland. This land is used for growing corn, alfalfa, and other crops, such as cowpeas, field peas, and sorghum, and for the pasture of the dairy herd.

The barn is built on the most approved model for the housing of dairy cattle, and is light, well-ventilated, and sanitary, with stalls for 110 cows. Four silos of modern type, feed rooms, a milk room, and a laboratory, exist in connection with the barn. Each of these illustrates some especially desirable feature in dairy building construction.

The dairy herd consists of excellent types of the four dairy breeds: Jersey, Guernsey, Ayrshire, and Holstein. These animals are pure bred, and a number have been entered in the advanced registry of their respective breeds. The excellence of the dairy herd is shown by the yearly records of the cows in the herd that have been officially tested. The average for the Guernseys is 8,717 pounds of milk and 425 pounds of

butterfat; for the Ayrshires, 11,805 pounds of milk and 454 pounds of butterfat; for the Holsteins, 14,777 pounds of milk and 491 pounds of butterfat, and for the Jerseys, 9,176 pounds of milk and 484 pounds of butterfat. Maid Henry, a thirteen-year-old Holstein, produced 19,000 pounds of milk, yielding 715 pounds of butterfat in one year. Canary Bell, an Ayrshire, produced in one year 19,863 pounds of milk, containing 744 pounds of butterfat, which is equivalent to 930 pounds of average butter, 80 per cent fat. This is the highest record ever made in Kansas. Melrose Canary Bell, a daughter of Canary Bell, was the highest tested junior two-year-old for the Ayrshire breed in 1917. Canary Bell was the highest tested mature Ayrshire in the United States during 1918. Bangora's Melrose was the highest tested senior three-year-old for the same year, with 14,515 pounds of milk and 568 pounds of butterfat. Owl's Design is the highest record Jersey in the State with her record of 14,606 pounds of milk and 650 pounds of butterfat.

In the National Dairy Judging contests, the students specializing in dairying from the Kansas State Agricultural College have always been placed high. In 1919 the team from this institution won first place in this contest, in competition with judging teams from fifteen other agricultural colleges.

The dairy building houses the creamery, the cheese rooms, the classrooms, and the offices, and the necessary laboratories for testing and hand-separator work. Refrigeration is secured from a refrigerating machine and ice plant installed in the building. These facilities of barn, herd, and laboratories are in constant use by the students of dairying. The instruction in dairy husbandry includes the study of the selection and breeding of dairy animals, the production of milk, its manufacture into butter, cheese, and other dairy products, or its sale on the market.

COURSES IN DAIRY HUSBANDRY

FOR UNDERGRADUATES

101. ELEMENTS OF DAIRYING Freshman year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Professor Fitch, Assistant Professor Olson, Mr. Atkeson and Mr. Huffman.

This is a general course in dairying, dealing with the secretion, composition and properties of milk, with the factors influencing the quantity and quality of milk, and with care of milk and cream on the farm. It includes a study of the different methods of creaming, the construction and operation of farm separators, the principles and application of the Babcock test, the use of the lactometer, and butter making on the farm. Lectures, supplemented by text, Stocking's *Manual of Milk Products*.

Laboratory.—Practice is given in operating the Babcock test and lactometer, separation of milk, and farm butter making.

102. TYPES AND CLASSES OF LIVE STOCK (VET). Sophomore year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Assistant Professor Cave.

One-fourth of this course, which is described more fully under the Department of Animal Husbandry, is given by members of the Department of Dairy Husbandry, and comprises the judging and scoring of dairy cattle.

104. DAIRY JUDGING. Freshman year, first and second semesters. Laboratory, three hours. One semester credit. Assistant Professor Cave, Mr. Atkeson, and Mr. Huffman.

This course calls for the judging of dairy stock from the standpoint of economical production and breed type. Score cards are used for the purpose of training the student to become accurate, thorough and systematic in the selection of animals as representatives of breeds or for breeding purposes. No textbook is required. *Types and Breeds of Farm Animals*, by C. S. Plumb, and Breeder's Association literature are used as references.

106. DAIRY INSPECTION I. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Bact. 106, Chem. 254, and Dairy Husb. 101. Assistant Professor Olson.

Advanced work is given in the testing of dairy products, including testing for adulterations. Practice is given in the use of score cards for inspecting and grading milk depots, dairy farms, and creameries. The course is designed to give training in the duties of a city, state, or government inspector or commissioner. State and city ordinances governing the handling and public sale of dairy products are outlined. Text: Farrington and Woll's *Testing Milk and Its Products*.

108. MILK PRODUCTION. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Dairy Husb. 101 and An. Husb. 152. Professor Fitch.

This course deals with the economical production of milk and with the most approved method of handling the dairy herd, also the construction of dairy barns and buildings, and other subjects which relate to the dairy farmer.

110. BUTTER MAKING AND CREAMERY MANAGEMENT. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Dairy Husb. 101 and Bact. 211. Assistant Professor Olson.

This course comprises a study of the principles of creamery butter making, the construction and care of creameries and their appliances, methods of sampling and grading cream, pasteurization, starter making, cream ripening, and creamery accounting. Text: Guthrie's *The Book of Butter*.

Laboratory.—Practice is given in the sampling and grading of milk and cream; in separating and ripening cream; in the preparation and use of the starter in pasteurized and in raw cream; in churning; in working, washing, salting, and packing butter; and in keeping complete records of each operation. The work also includes the making of salt, fat, and moisture determinations of the finished product, and judging and scoring butter.

112. HOME DAIRYING. Elective, last half of second semester. Class work, two hours; laboratory, three hours. One and one-half semester credits. Assistant Professor Cave.

This course includes a study of the composition of milk, Babcock testing, separation of milk, cream ripening, and farm butter making; also a brief study of the breeds of dairy cattle. It is given with the elective course, Poult. Husb. 102, which is offered the first half of the second semester.

114. CHEESE AND ICE-CREAM MAKING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Chem. 254, Bact. 211, and Dairy Husb. 101. Assistant Professor Olson.

This course includes the making of cheese on the farm for home use and for sale, and the commercial manufacture of Cheddar cheese, comprising each detail from the receipt of the milk to the marketing of the finished product. The cheese work is given the first half of the semester; the manufacture and handling of ice cream and ices for the retail and

wholesale trade in the second half. Text: Van Slyke-Publow's *The Science and Practice of Cheese Making*

Laboratory.—Practice is given in making cheese under farm conditions and on a commercial scale. Records are kept of the different operations and their influence upon the finished product is noted. Exercises are given in testing, judging and scoring cheese. The latter half of the semester is devoted to the making of ice cream and ices.

116. MARKET MILK. Elective, first semester. Lecture, one hour; laboratory, three hours. Two semester credits. Prerequisites: Dairy Husb. 101 and Bact. 211. Assistant Professor Olson.

This course includes a study of the classes of market milk (certified, inspected and pasteurized, also other classifications), equipment and methods for clean milk production, and the relation of clean milk to producer, dealer, and consumer. Also systems of milk inspection, score cards, and milk and cream contests. Lectures are also given on milk plants, including their methods and equipment, such as receiving, storing, separating, removing sediment, pasteurization, bottling and capping, cleaning and sterilizing bottles and cans, the use of homogenizer and emulser and practical laboratory methods of examining milk.

Laboratory.—The work includes actual practice in all the steps in the production of market milk and cream in the College milk plant.

118. DAIRY INSPECTION II. Senior year, second semester. Laboratory, three hours. One semester credit. Assistant Professor Olson.

This course comprises the testing of dairy products, the inspection and scoring of dairies and milk depots, and the testing for adulterants in dairy products. Text: Farrington and Woll's *Testing Milk and Its Products*.

120. ADVANCED DAIRY JUDGING. Elective, second semester. Laboratory, three hours. One semester credit. Assistant Professor Cave.

This course is a continuation of Dairy Husb. 104. Visits are made to the best farms in the State and students are given an opportunity to judge and to handle stock kept by the most successful breeders.

FOR GRADUATES AND UNDERGRADUATES

202. DAIRY SEMINAR. Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Dairy Husb. 101, 106, and 108. Professor Fitch.

This course includes a study and review of dairy periodicals and experiment station bulletins, books and others dairy literature.

203. DAIRY HERD MANAGEMENT. Elective, second semester, senior year. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Dairy Husb. 108. Professor Fitch and Assistant Professor Cave.

This course is an advanced course in the feeding and management of the dairy herd. It takes up the study of pedigrees, feeding and management of advanced registry cows, the fitting of animals for show and sale, and other subjects pertaining to the management of dairy herds.

Reference Texts: Larson and Putney's *Dairy Cattle Feeding and Management*, and Eckles' *Dairy Cattle and Milk Production*.

FOR GRADUATES

301. DAIRY RESEARCH. Elective, both semesters. By appointment. Three semester credits. Prerequisites: Dairy Husb. 108 and 110. Professor Fitch.

This course gives credit on special problems assigned to students.

General Agriculture

Dean FARRELL

FOR UNDERGRADUATES

101. AGRICULTURAL LECTURES. Freshman year, first semester. Lectures, one hour a week. Required of all freshmen in agriculture. Deans of the Divisions of Agriculture, Veterinary Medicine, Extension, and the Summer School, and heads of departments in the Agricultural Experiment Station.

These lectures are designed to inform freshmen regarding the prospective opportunities for those who prepare themselves for service in the various fields of work open to agricultural students, and regarding the requirements for success in those fields.

FOR GRADUATES AND UNDERGRADUATES

201. AGRICULTURAL RELATIONSHIPS. Senior year, second semester. Class work, one hour. One semester credit. Required of all seniors in agriculture, and open to them and to graduates only. Dean Farrell.

This course is designed for agricultural students who are about to enter upon their life work. It is given for the purpose of directing the attention of these students to their duties, responsibilities, and opportunities for service as citizens of the agricultural community and as specialists in various phases of agricultural activity. It consists of lectures and discussions relating to the broad, fundamental relationships of individual farmers and other agricultural people with each other, and of the agricultural community with other communities. The course places special emphasis in this connection on the responsibilities, obligations, and opportunities of agricultural graduates as American citizens.

Horticulture

Professor DICKENS
Professor AHEARN
Instructor PICKETT

Instructor _____
Assistant VIRTANEN

A wealth of illustrative material for classes in all horticultural subjects is found in the large collection of species growing upon the College campus, in the orchard plantations, and in the greenhouses.

The horticultural grounds consist of eighty acres of land devoted exclusively to horticultural and forestry work in gardens, nurseries, orchards, and vineyards. A new small-fruit plantation is being developed, in which will be planted all standard varieties of small fruits. A full equipment of garden tools, spraying machinery and accessories, pruning tools, and special apparatus for floriculture is available at all times for the use of students. The College grounds furnish one of the finest and most complete laboratories in the State for the study of landscape gardening.

The instruction in the Department of Horticulture covers fruit judging, plant propagation, pomology, gardening, small fruits, spraying, orcharding, greenhouse problems, and the various branches of landscape gardening.

COURSES IN HORTICULTURE

FOR UNDERGRADUATES

101. PLANT PROPAGATION. Freshman year, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Bot. 101. Mr. Pickett.

This course includes a discussion of natural and cultural methods of propagation; seeds, seed testing, and seed growing; the treatment required for different kinds of seeds, the production of seedlings for stock; grafting, budding, layering; the making of cuttings, and the special requirements for propagating commercial fruits and ornamental plants. The work is given by means of lectures and assigned readings.

Laboratory.—Practical work is given in the preparation of seeds and in seed testing; in the preparation of seed beds, and in the use of seeding machinery; in transplanting, grafting, budding, and in general nursery practice.

104. SYSTEMATIC POMOLOGY. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ahearn.

This course comprises exercises in identification and description of the different types of fruits, such as grapes, peaches, apples, pears, and citrus fruits. An intercollegiate exchange of fruit makes possible a valuable study of the effect of climatic conditions upon variety and characteristics. Work is also done in the selection, preparation, and judging of fruits for exhibits. Text: Waugh's *Systematic Pomology*.

107. ORCHARDING. Sophomore year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Hort. 101. Professor Ahearn and Mr. Pickett.

This course includes studies of the conditions necessary for success with orchards, including location, improvement of soil, application of fertilizers and cultural methods, and pruning. Spraying and pruning practice are given in the laboratory.

Laboratory.—In the laboratory a study is made in laying out plantations and orchards. Various systems of setting, topography of various localities, adaptability of level and hilly sections, methods of setting, pruning for setting, work in orchards with trees of various species and varying ages and a study and observation of cover crops, methods of cropping and general orchard practices up to bearing age are given consideration.

110. SMALL FRUITS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Hort. 101. Professor Ahearn.

The small fruits of commercial importance are considered with reference to their requirements as to soil, fertilizers, cultivation, and protection. The management of small areas designed to furnish a supply of fruits for home use, and the handling of commercial plantations, are considered.

113. FARM FORESTRY. Elective, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Professor Dickens.

This course consists of a study of the needs of Kansas farms for windbreaks and wood lots for post and fuel production; also a study of forest conservation and methods of handling timber. The growing of trees in locations better suited for timber than for other crops is considered; also the composition of windbreaks and their value as a protection to home orchards and fields.

Laboratory.—Laboratory work includes identification of species, methods of forming windbreaks, and nursery work in transplanting trees of various sizes and a determination of the rate of growth of trees under various conditions.

116. DENDROLOGY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ahearn.

In this course a study is made of the classification and identification of forest trees, including a study of forest ecology and taxonomy; of the classification of commercial species; the relative importance of timber species; and the life history and requirements of trees.

Laboratory.—The laboratory work consists of studies in the College arboretum and excursions to near-by wood lots. The student is given an opportunity to become acquainted with trees that succeed well in this State.

119. SILVICULTURE. Elective, second semester. Class work, two hours; field work, three hours. Three semester credits. Prerequisite: Hort. 113 or 116. Professor Dickens.

The business of tree growing for timber and economic purposes is studied. Requirements of species, their range and requirements as to soils, climate and the various factors that determine their reproduction and rate of growth are discussed. Protection of forests from fire and insects and the application of various systems of silviculture are given consideration.

122. GARDENING. Sophomore year, second semester. Class work, three hours. Three semester credits. Professor Ahearn.

It is the purpose of this course in gardening to give young women a working knowledge of and a close acquaintance with the garden as it concerns the home. The first part of the course is concerned with the principles of plant growth, the relation of soils to plants, and the methods necessary for successful work in kitchen gardening, flower beds, window gardening, the requirements of plants in regard to watering, temperatures, hotbeds and the first principles of floriculture.

In the latter part of the course the young women are introduced to the principles of landscape gardening, with particular reference to the problems of home plantings. In conjunction with the lectures, each member of the class is required to prepare plans for town home, farm home and country place, and the classes are required to do group work that will give them an insight into the needs of school grounds. Playgrounds, public parks, and cemeteries are considered and are given a considerable amount of time.

Particular emphasis is placed upon acquaintance with materials that are used for garden purposes. The College campus, gardens, and greenhouses furnish a wealth of material that is best adapted to garden problems and landscape composition.

125. LANDSCAPE GARDENING I. Elective, second semester and summer school. Class work, two hours; laboratory, six hours. Four semester credits. Professor Ahearn.

This course is designed for the individual needs of students and for those who expect to take advanced work in landscape art. The principles of landscape gardening are studied and civic improvement problems discussed, special attention being given to rural and city problems.

Laboratory.—The laboratory consists of field trips and work in fields, in excavation and leveling. Students are instructed in the delineation of landscape plans with special reference to home and city planning.

128. GREENHOUSE CONSTRUCTION AND MANAGEMENT. Elective, first semester. Class work, three hours. Three semester credits. Professor Ahearn.

This course consists of work covering the more important points of greenhouse construction and the proper methods of conducting the greenhouse business. Not only is this subject treated from the commercial standpoint, but the management of private conservatories is also carefully studied.

131. SCHOOL GARDENING. Elective, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Mr. ———.

The object of this course is to give teachers a knowledge of the principles which underlie success in gardening and the adaptation of small areas to the production of vegetables and flowers. The subjects of soil preparation, seed selection, fertilizers, hotbeds, plant manipulation, and the planning of the garden are given special consideration. Opportunity is given for teachers to become familiar with general garden methods and the use and manipulation of garden tools, including seeders, weeders, and wheel hoes. Allotments of ground areas required for different crops, the length of time required to mature various vegetable and flower crops, the adaptation of these to country and city schools, and suggestions for marketing, are among the subjects considered.

FOR GRADUATES AND UNDERGRADUATES

201. PRACTICAL POMOLOGY. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Hort. 104. Professor Ahearn.

The class work is given by means of lectures, and includes practical information on harvesting, grading, packing, storage, marketing, and the use of fruit by-products.

Laboratory.—The laboratory work consists of field work in the harvesting, grading, and packing of fruits. Several types of mechanical graders are used for demonstrations. Intensive work is given in packing of the various types in boxes and barrels. A thorough study is made of storage practice. Practice in pruning work is also given.

204. ORCHARD MANAGEMENT. Elective, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Professor Dickens and Mr. Pickett.

The class work includes studies of the following factors that are of vital importance to fruit growers: Location, soil improvement, cultural methods, pruning, capital and equipment for handling orchards, and crop disposition.

Laboratory.—This course offers practice in establishing young orchards, spraying (orchard work), pollination studies, thinning of fruit, summer pruning, and problems in orchard management.

207. SPRAYING. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Chem. 102. Mr. Pickett.

The class work consists of lectures on spraying machinery, accessories, and the principal materials used as insecticides and fungicides.

Laboratory.—The laboratory work offers exercise in the preparation and testing of spray materials. Special study is given to the construction of the various types of spray machinery. Nozzles and spray guns are carefully tested.

210. MARKET GARDENING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Professor Ahearn.

This course is made as practical as possible. In the classroom the lecture work is reinforced with problems concerning the business end of market gardening. The students are required to prepare seed orders and estimate the cost per acre of growing various garden crops. Particular stress is laid upon the harvesting, storing, and marketing of vegetables.

Laboratory—The laboratory work is given in the College gardens. Each student is assigned a plot of ground to plant and care for during the semester. Careful records are kept of cultural operations and the yields. Disease and insect control are studied in a practical way.

222. HISTORY AND LITERATURE OF LANDSCAPE GARDENING. Elective, first semester. Class work, two hours. Two semester credits. Mr. ———.

This course consists of a study of the history and literature of landscape gardening with special reference to the early influences as they govern modern design.

225. PLANT MATERIALS IN LANDSCAPE GARDENING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Hort. 101. Professor Ahearn.

A thorough study is made of the hardiness, form, color, habits, and adaptations of trees, both deciduous and evergreen, shrubs, hardy perennials, biennials, and annuals with a view to giving the student a working knowledge of the materials essential to formulate a working landscape plan.

233. TREE SURGERY. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Bot. 208. Mr. ———.

This course consists of a study and practice of the most approved methods of caring for ornamental trees and the technical details of planting, pruning and spraying, bolting, chaining, and cavity work. Shade tree legislation and the duties of shade-tree commissions and tree wardens are discussed.

FOR GRADUATES.

301. LANDSCAPE GARDENING II. Elective, second semester. Laboratory, nine hours. Three semester credits. Professor Ahearn.

A study is made of the more advanced problems of designing and reconstruction from topographic and transit surveys as offered by large areas of parks, playgrounds, and country estates.

303. THE THEORY AND ESTHETICS OF LANDSCAPE GARDENING. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Hort. 222. Professor Ahearn.

A careful study is made of the underlying principles of landscape art and design. This course is primarily intended for students who wish to specialize in landscape work, but will be of interest to all those who intend to teach.

306. CITY AND TOWN PLANTING. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ahearn.

This course has to do with laying out parks, boulevards, streets, etc., and with special studies in civic improvement. A special study is also made of cities and towns located in different parts of the world.

309. ORCHARD ECONOMICS. Credit determined by instructor. Professor Dickens.

An opportunity is given the students in this course to do research work in the cost of production and distribution, including storage, methods of packing, and transportation. The course is elastic and may extend

over the full year with its crops. Some traveling expenses incident to visiting various sections of the State in investigating storage and markets may be required.

312. MARKET GARDENING PROBLEMS. Credit determined by instructor. Professor Ahearn.

This course includes a study of the important methods of production of standard vegetables of both garden and greenhouse. Special attention is given to the problems of marketing, including organization and formation of first-hand markets in cities by express and parcel post shipments and the possibilities of improving storage and shipping facilities in order to prolong the period of salable condition.

315. POMOLOGICAL RESEARCH WORK. Credit determined by instructor. Professor Ahearn.

Graduate students will be permitted to select any special problem that will have a direct bearing on promotion of the fruit industry. Fruit-bud formation, soil adaptation of varieties, and the effect of fertilizers are a few of the problems that offer splendid opportunities for graduate study.

318. FORCING FLOWERS AND VEGETABLES. Credit determined by instructor. Professor Ahearn.

The propagation and cultural methods, soil studies, ventilation, heating, watering, and control of greenhouse pests are among the problems studied.

Milling Industry

Professor FITZ
Assistant Professor DUNTON
Miller OAKES

The Department of Milling Industry was established primarily to undertake investigations in the handling, marketing and milling of wheat. Every student of agriculture should have some knowledge of this subject, and also of the handling of grain products other than those obtained from wheat. A full and complete knowledge of the needs of grain growing as an industry must necessarily include the utilization of grain in the manufacture of food, together with the natural by-products resulting therefrom.

The department has a well-equipped plant, consisting of six double-stand 7" x 14" rolls, with necessary cleaning machinery and dust collectors, sifters, and purifiers. The results secured here are comparable with those from a regular commercial mill. A baking laboratory equipped with proofing closet, dough mixer, and electric ovens is open for student use, as is also a laboratory for chemical tests on wheat and flour.

COURSES IN MILLING INDUSTRY

FOR UNDERGRADUATES

101. PRINCIPLES OF MILLING. Sophomore year and elective, second semester. Laboratory, three hours. One semester credit. Miller Oakes.

This course includes a study of the theory and practice of milling with demonstrations on a small experimental mill.

102. GRAIN MARKETING. Junior year and elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Agron.

101. Professor Fitz.

This course includes a study of methods of handling, storing, marketing and grading of grain; the history of the origin and development of grain inspection and grades; a study of commercial grain grades and government standards; the classification and organization of inspection systems; the organization and functions of grain exchanges or boards of trade; and principal grain markets, with receipts, shipments, and consumption.

103. GRAIN PRODUCTS. Junior year and elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Mill. Ind. 102. Professor Fitz.

A brief study of the methods of manufacturing food products from cereals, with the resulting by-products, and a comparison of composition and feeding value of these by-products are included in this course.

109. MILLING PRACTICE I. Junior year and elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Mill. Ind. 101. Miller Oakes.

This course consists of practice in the art of milling, with demonstrations on a model mill.

110. MILLING PRACTICE II. Senior year and elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Mill. Ind. 109. Miller Oakes.

This course is a continuation of Milling Practice I.

FOR GRADUATES AND UNDERGRADUATES

203. WHEAT AND FLOUR TESTING. Senior year and elective, first semester. Class work, one hour; laboratory, nine hours. Four semester credits. Prerequisites: Mill. Ind. 103, Chem. 120, 150 and 260. Assistant Professor Dunton.

This course includes special quantitative tests applied to cereals and their by-products; methods of analysis and interpretation of results.

204. EXPERIMENTAL BAKING A. Senior year and elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Mill. Ind. 203. Assistant Professor Dunton.

This course includes practice in baking tests; comparison of methods, formulas, and flour; and interpretation of results.

205. EXPERIMENTAL BAKING H. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Food and Nut. 106. Assistant Professor Dunton.

This course includes demonstration in milling and practice in bread making; comparison of methods, yeasts and flours, and a study of the more important conditions which influence the quality of bread.

Poultry Husbandry

Professor LIPPINCOTT
Assistant Professor FOX
Superintendent MUGGLESTONE

The poultry plant, occupying twelve acres and situated just north of the northeast corner of the College campus, is devoted to the breeding and rearing of the stock used for class work. It is equipped with various types of houses, runs, incubators, and brooders, and with flocks of the leading breeds of fowls.

There is in the government and state experiment stations and in schools and colleges an increasing demand for men with experience and

systematic training in handling poultry. There is likewise a growing demand for men to enter poultry-packing houses and for men capable of managing poultry-farming enterprises of considerable proportions.

COURSES IN POULTRY HUSBANDRY

FOR UNDERGRADUATES

101. FARM POULTRY PRODUCTION. Sophomore year, both semesters and summer school. Class work, one hour; laboratory, three hours. Two semester credits. Professor Lippincott and Assistant Professor Fox.

This course takes up the problems of poultry management on the general farm. The subjects of feeding, housing, breeding, incubation, brooding, and preparing poultry for market are studied.

102. HOME POULTRYING. Elective, second semester. Class work, three hours for the first half of the semester. One and one-half semester credits. Professor Lippincott and Assistant Professor Fox.

This course takes up the problems of poultry management for egg and meat production. The subjects of feeding, breeding, housing, incubation, brooding, and preparing poultry for market are studied. It is given with the elective course, Dairy Husb. 112, the second half of the semester.

104. PRACTICE IN POULTRY FEEDING. Elective, first semester. Three times a day, seven days a week, for a period of six weeks, at hours outside of the regular schedule. One semester credit. Prerequisite: Poult. Husb. 101. Assistant Professor Fox.

This course consists of the actual care of a flock of fowls by the student under the supervision of an instructor. Careful records are kept of the feeds consumed and the eggs produced. A financial statement is required at the end of the feeding period.

105. PRACTICE IN INCUBATION. Elective, second semester and summer school. Three times a day, seven days a week, for a period of not less than four weeks at hours outside of regular schedule. One to two semester credits. Prerequisite: Poult. Husb. 101. Assistant Professor Fox.

This course consists of the care of an incubator by the student through the incubation period, testing the eggs and bringing off the hatch. Careful records of fertility, cost of incubation, and varying temperature, moisture, and ventilation conditions are kept. For one credit one successful hatch must be brought off in either a hot-air or hot-water incubator; for further credit other types must be operated. Students specializing in poultry husbandry must take two credits.

107. PRACTICE IN BROODING. Elective, second semester and summer school. Three times a day, seven days a week, for a period of not less than four weeks, at hours outside the regular schedule. One to three semester credits. Prerequisite: Poult. Husb. 101. Assistant Professor Fox.

In this course each student handles a flock of chicks. He has the entire care of brooding and feeding them during the most critical weeks. A report of cost of fuel and feed, of gains in weight and of mortality is required. This course must be preceded or accompanied by practice in incubation. For one credit, a group of at least fifty chicks must be successfully brooded for four weeks, in any one of the several types of brooders. For further credits, broods must be handled successfully in two other types of brooders for at least six weeks. Students specializing in poultry husbandry must take three credits.

108. PRACTICE IN MILK FEEDING. Elective, first semester. Twice a day, seven days a week, for a period of six weeks, at hours outside the

regular schedule. One semester credit. Prerequisite: Poult. Husb. 101. Assistant Professor Fox.

This course consists of milk feeding poultry confined in crates. The time is divided into periods of two weeks, so that the student will have an opportunity to fatten three lots of chickens. A financial statement is required.

110. POULTRY BREEDS AND TYPES Elective, first semester and summer school. Class work, one hour; laboratory, three hours. Two semester credits. Assistant Professor Fox.

In this course a historical study is made of the various breeds commonly found on the Kansas farm. Particular attention is paid to tracing the evolution of the present types. The laboratory is given over largely to judging the different breeds and varieties, both by score card and by comparison.

111. ADVANCED POULTRY JUDGING. Elective, second semester. Laboratory, three hours. One semester credit. Prerequisite: Poult. Husb. 110. Offered alternate years; given in 1920-'21. Assistant Professor Fox.

This course is a continuation of Poult. Husb. 110. It gives further practice in judging the more common varieties, and takes up some of the rarer breeds.

112. MARKET POULTRY. Elective, first semester and summer school. Class work, one hour; laboratory, three to six hours. Two to three semester credits. Prerequisite: Poult. Husb. 101. Assistant Professor Fox.

In this course the lectures cover the methods of handling market poultry, alive and dressed. For three hours of laboratory work, practice is given in candling and grading eggs, caponizing, killing, cooling, grading and packing poultry for market. When six hours of laboratory work is taken, the student will also feed three lots of chickens for a period of two weeks.

FOR GRADUATES AND UNDERGRADUATES

202. POULTRY BREEDING. Elective, second semester. Conferences and laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 112. Professor Lippincott.

The experimental work on inheritance in poultry is reviewed by means of assigned readings and laboratory experiments:

POULTRY FARM MANAGEMENT. See Ag. Ec. 206.

POULTRY BACTERIOLOGY. See Bact. 216.

POULTRY ANATOMY. See Anat. 210.

204. COMPARATIVE ANATOMY OF DOMESTIC BIRDS. Elective, second semester. Offered alternate years; given in 1920-'21. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Zoöl. 117. Professor Lippincott.

This course is designed particularly for those intending to teach, or carry on research in, poultry husbandry, or who are particularly interested in bird study. The various structures of domestic birds are discussed in the lectures, in their relation to the same structure in wild forms, and in a limited measure to other vertebrates, as well as from a development standpoint.

The laboratory work is given over to the dissection and the first-hand comparison of the structures of the several species of domestic birds common in the Central West.

205. POULTRY RESEARCH. Elective, both semesters and summer school. Credit as arranged. Prerequisites: Poult. Husb. 101, 104, 105, and 107,

and such other courses as the problem undertaken may require. Professor Lippincott, and Assistant Professor Fox.

In this course the student pursues a definite investigation concerning some phase of poultry work. Arrangements must be made to continue this work through more than one semester when the problem attacked cannot be solved within the limits of a single semester.

Agriculture in the Summer School

During recent years the greatest hindrance to the general introduction of agriculture into the high schools and grade schools of the State has been the lack of properly prepared teachers. The recent Federal Smith-Hughes act and its acceptance by the State of Kansas will within a few years lead to a large demand for teachers of vocational agriculture in Kansas high schools. The World War has both increased the demand for teachers of agriculture and demonstrated the necessity of the introduction of vocational agriculture into the high schools. The Agricultural College stands ready to aid teachers of the State, young women as well as young men, in their preparation to meet these demands, and the Summer School offers to active teachers an exceptional opportunity in this respect.

The work offered in the summer session includes courses in grain crop production, soils, soil fertility, common-school agriculture, live-stock judging, principles of feeding, teachers' course in animal husbandry, elements of dairying, dairy judging, poultry production, poultry judging, practice in incubation and brooding, plant propagation, orcharding, school gardening, and methods of teaching agriculture in high schools. Special emphasis is laid upon the subject matter and methods adapted to secondary and elementary schools.

Brief information regarding many of these courses in the Summer School may be found in the department descriptions in this catalogue. For further information write to the Dean of the Summer School.

Special Courses in Agriculture

The Farmers' Short Course and the Course in Testing Dairy Products are grouped with other special courses in another part of the catalogue, and are there described. They may be found by reference to the general index in the back of this book.

Division of Veterinary Medicine

RALPH RALPH DYKSTRA, *Dean*

The College has one of the best-equipped schools of veterinary medicine in the West. It is rated in class "A" by the United States Department of Agriculture, which rating places it among the best in the United States and Canada. In addition to giving the student the best possible technical training in veterinary medicine, the course is designed to give the broad culture necessary for men who are to take their places in public affairs. Professional men, such as veterinarians, are placed in a more or less public relation to the communities they serve. They must have a broad groundwork in cultural and ethical training, which will win them the confidence and respect of their communities. Success is measured in something more than dollars and cents, and the man whose view of life is no broader than his profession adds but little to the world and its happiness. The training given by the College in veterinary science, as in its curriculum in agriculture, seeks to emphasize the value of the man as a man, as much as his value as a specialist.

The Department of Veterinary Medicine gives most of the technical work in the curriculum in veterinary medicine, a general description of which is given below. The department is housed in the Veterinary Building, which was erected at a cost of over \$60,000, and is thoroughly equipped throughout. It contains modern classrooms, and its laboratories possess the necessary appliances for illustrating the several subjects required. The mode of instruction is more specifically detailed in succeeding sections.

The policy adhered to in the instruction in all the departments is that the science of veterinary medicine is the foundation, and the art merely supplementary. A thorough drill is given in the foundation studies, and later in the curriculum practical application of these is made in actual field work. This result is a thoroughly scientific veterinary education.

In the arrangement of the schedule of the veterinary curriculum it is implied that the courses should be followed in regular sequence, as each year's work depends upon the work done the previous year. Certain courses, however, may be selected as electives if a student has the necessary prerequisites. These courses are listed in the list of electives.

THE CURRICULUM IN VETERINARY MEDICINE

Veterinary medicine has made remarkable advances within recent years, and is taking its place alongside human medicine as a science. In truth, medical science and veterinary science are but specialized branches of the same science, and must be developed together. The modern veterinarian takes his place in the community as a professional man of education and culture. With the general improvement of the live stock on the farms, and with the advance of live stock in value, there is constant increase in the demand for skilled physicians to care for them.

The veterinarian, while primarily trained to conserve the health of farm animals, has a yet larger service to render in preventing diseases common to both man and beast from being communicated from domestic animals to man. Moreover, he must see that the animals slaughtered for meat are healthy and that the products are handled under such conditions as to render them suitable for human food. The public is now demanding that milk and other food products be free from contamination and that they be incapable of transmitting dangerous diseases, like tuberculosis, typhoid fever, scarlet fever, and diphtheria. There is ample work for all of the thoroughly competent veterinarians that the colleges of the country will train.

The curriculum in veterinary medicine at the Agricultural College was established to give the young men of this State an opportunity to pursue these studies in an agricultural environment, where the facilities offered by other branches of the College would be at their command. While the instruction in this curriculum is largely technical, enough subjects of a general character are included to give a sound education and a broad outlook. Better to fit the veterinarian to deal wisely with the live-stock problems which he has to meet, he is required to take the work in live-stock feeding, breeding and judging, and in milk inspection, zoölogy, and embryology, in addition to his purely professional work.

The diploma from this school is recognized by the United States Department of Agriculture, by the United States Civil Service Commission, by the American Veterinary Medical Association, and by the various examining boards of the several states and territories of America where it has been presented.

THE CURRICULUM IN ANIMAL HUSBANDRY AND VETERINARY MEDICINE

The combined curriculum in animal husbandry and veterinary medicine has been outlined so that students may receive the degree of bachelor of science at the end of four years, and the degree of doctor of veterinary medicine at the end of two years more, thus securing both degrees in six years.

Curriculum in Veterinary Medicine

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | | SECOND SEMESTER | |
|------------------------|-----------|-------------------------|---------|
| Anatomy I | | Anatomy II | |
| Anat. 101 | 6(3-9) | Anat. 106 | 7(3-12) |
| Histology I | | Histology II | |
| Path. 101 | 3(1-6) | Path. 106 | 3(1-6) |
| Chemistry AV-I | | Chemistry V-II | |
| Chem. 105 | 5(3-4, 2) | Chem. 106 | 5(3-6) |
| General Zoölogy Vet. | | Embryology Vet. | |
| Zoöl. 111 | 3(2-3) | Zoöl. 114 | 2(1-3) |
| Military Science I | | Military Science II | |
| Mil. Tr. 101 | 1(0-4) | Mil. Tr. 102 | 1(0-4) |
| Physical Education M-I | | Physical Education M-II | |
| Phys. Ed. 103 | R(0-2) | Phys. Ed. 104 | R(0-2) |

SOPHOMORE

FIRST SEMESTER

| | |
|--|---------|
| Anatomy III | |
| Anat. 111 | 5(1-12) |
| Comparative Physiology I | |
| Anat. 121 | 5(4-3) |
| Medical Botany | |
| Bot. 126 | 2(1-3) |
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Types and Classes of Live Stock (Vet.) | |
| An. Husb. 134..... | 3(1-6) |
| Military Science III | |
| Mil. Tr. 103..... | 1(0-4) |
| Physical Education M-III | |
| Phys. Ed. 105..... | R(0-2) |

SECOND SEMESTER

| | |
|---------------------------|--------|
| Anatomy IV | |
| Anat. 116 | 3(1-6) |
| Comparative Physiology II | |
| Anat. 126 | 3(2-3) |
| Pathogenic Bacteriology I | |
| Bact. 111 | 4(2-6) |
| Materia Medica I | |
| Surg. 151 | 2(2-0) |
| Principles of Feeding | |
| An. Husb. 152..... | 3(3-0) |
| Genetics | |
| An. Husb. 221..... | 3(3-0) |
| Military Science IV | |
| Mil. Tr. 104..... | 1(0-4) |
| Physical Education M-IV | |
| Phys. Ed. 106..... | R(0-2) |

JUNIOR

FIRST SEMESTER

| | |
|----------------------------|--------|
| Surgery I | |
| Surg. 101 | 3(3-0) |
| Diagnosis | |
| Surg. 170 | 2(2-0) |
| Materia Medica II | |
| Surg. 156 | 2(2-0) |
| Pharmacy | |
| Surg. 166 | 1(0-3) |
| Pathology I | |
| Path. 201 | 5(4-3) |
| Pathogenic Bacteriology II | |
| Bact. 116 | 4(2-6) |
| Clinics I | |
| Surg. 136 | 3(0-9) |

SECOND SEMESTER

| | |
|-----------------|--------|
| Surgery II | |
| Surg. 106 | 3(3-0) |
| Medicine I | |
| Surg. 173 | 4(4-0) |
| Horseshoeing | |
| Surg. 126 | 1(1-0) |
| Therapeutics | |
| Surg. 161 | 3(3-0) |
| Pathology II | |
| Path. 206 | 6(4-6) |
| Clinics II | |
| Surg. 139 | 3(0-9) |

SENIOR

FIRST SEMESTER

| | |
|-------------------|---------|
| Surgery III | |
| Surg. 111 | 3(3-0) |
| Medicine II | |
| Surg. 176 | 5(5-0) |
| Pathology III | |
| Path. 211 | 3(2-3) |
| Meat Inspection | |
| Path. 216 | 2(2-0) |
| Parasitology | |
| Zoölogy 123 | 2(1-3) |
| Clinics III | |
| Surg. 142 | 4(0-12) |

SECOND SEMESTER

| | |
|----------------------|---------|
| Surgery IV | |
| Surg. 116 | 3(3-0) |
| Medicine III | |
| Surg. 180 | 5(5-0) |
| Ophthalmology | |
| Surg. 183 | 1(1-0) |
| Operative Surgery | |
| Surg. 121 | 1(0-3) |
| Jurisprudence | |
| Anat. 161 | 1(1-0) |
| Obstetrics | |
| Surg. 131 | 3(3-0) |
| Dairy Inspection II | |
| Dairy Husb. 118..... | 1(0-3) |
| Clinics IV | |
| Surg. 145 | 4(0-12) |

Curriculum in Animal Husbandry and Veterinary Medicine*

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

Freshman year of the Curriculum in Agriculture

SOPHOMORE

| FIRST SEMESTER | | SECOND SEMESTER | |
|--------------------------|-----------|---------------------------|-----------|
| Organic Chemistry | | Quantitative Analysis I | |
| Chem. 120 | 3(2-2, 1) | Chem. 150 | 2(0-6) |
| General Zoölogy | | Pathogenic Bacteriology I | |
| Zoöl. 105 | 5(3-6) | Bact. 111 | 4(2-6) |
| Anatomy I | | Anatomy II | |
| Anat. 101 | 6(3-9) | Anat. 106 | 7(3-12) |
| Grain Crop Production | | Forage Crop Production | |
| Agron. 101 | 3(2-2, 1) | Agron. 102 | 3(2-2, 1) |
| Military Science III | | Agricultural Journalism | |
| Mil. Tr. 103 | 1(0-4) | Ind. Jour. 121 | 1(1-0) |
| Physical Education M-III | | Military Science IV | |
| Phys. Ed. 105 | R(0-2) | Mil. Tr. 104 | 1(0-4) |
| | | Physical Education M-IV | |
| | | Phys. Ed. 106 | R(0-2) |

JUNIOR

| FIRST SEMESTER | | SECOND SEMESTER | |
|--------------------|---------|-----------------------|--------|
| Embryology | | Principles of Feeding | |
| Zoöl. 117 | 3(2-3) | An. Husb. 152 | 2(3-0) |
| Anatomy III | | Anatomy IV | |
| Anat. 111 | 5(1-12) | Anat. 116 | 3(1-6) |
| Histology I | | Histology II | |
| Path. 101 | 3(1-6) | Path. 106 | 3(1-6) |
| General Entomology | | Electives† | 7 |
| Ent. 101 | 3(2-3) | | |
| Electives† | 3 | | |

SENIOR

| FIRST SEMESTER | | SECOND SEMESTER | |
|--------------------------|--------|----------------------------|-----------|
| Genetics | | Agricultural Relationships | |
| An. Husb. 221 | 3(3-0) | Gen. Agric. 201 | 1(1-0) |
| Comparative Physiology I | | Soil Fertility | |
| Anat. 121 | 5(4-3) | Agron. 132 | 3(2-2, 1) |
| Soils | | Comparative Physiology II | |
| Agron. 131 | 4(3-3) | Anat. 126 | 3(2-3) |
| Agricultural English | | Materia Medica I | |
| Engl. 137 | 3(3-0) | Surg. 151 | 2(2-0) |
| Electives | 1 | Electives | 7 |

FIFTH YEAR

Junior year of the curriculum in Veterinary Medicine

SIXTH YEAR

Senior year of the curriculum in Veterinary Medicine

* This curriculum is so arranged that students may receive the degree of bachelor of science (in agriculture) at the end of four years, and the degree of doctor of veterinary medicine at the end of two more years.

† Six semester credit hours of junior electives must be chosen from the work offered by the departments of history, economics, education, modern languages, or mathematics.

Anatomy and Physiology

Professor BURT
Instructor McLEOD

This branch of veterinary medicine extends over the freshman and sophomore years for veterinary students, and one semester is required in the curriculum in agriculture.

The classroom instruction consists of lectures, quizzes and recitations and special dissection of the part under discussion, also a study of dissected specimens, various models, and the Azoux model of the horse. Mounted skeletons and limbs, and loose bones are abundant in the museum. The horse is taken as a type and the other domestic animals are compared with the horse. As often as necessary parts of other animals are dissected to show the differences.

The subjects for dissection are preserved by the injection of a formalin solution followed by a starch solution colored red, which fills and hardens within the arteries. Each half of the subject is divided into three parts; namely, the head and neck, fore limb and thorax, hind limb and posterior half of body. The students work in pairs, each pair dissecting one part before passing on to another part. The work is so arranged that bones are first studied, then the muscles and joints. This is followed by the dissection of the circulatory and nervous systems. The viscera of certain regions are studied by the students at work on those respective parts, *i. e.*, the abdominal organs are studied by the students at work on the hind limb, etc.

The courses in anatomy require several lecture rooms, which contain models, skeletons, and bones of all kinds, and a thoroughly sanitary dissecting room equipped with all of the latest materials necessary to give a course in anatomy second to none on the continent.

The equipment for instruction in physiology is ample to give the student a thoroughly comprehensive course of laboratory study.

In addition to numerous atlases and charts furnished by the College, the student is required to have *Sisson's Veterinary Anatomy* as a textbook and *Sisson's Dissecting Guide* as a laboratory guide.

COURSES IN ANATOMY

FOR UNDERGRADUATES

101. ANATOMY I. Freshman year, first semester. Class work, three hours; laboratory and dissection, nine hours. Six semester credits. Doctors Burt and McLeod.

This course consists of the osteology, or the study of the bones, and the dissection of one-third of the horse. The bones of the horse are studied in detail and a comparison of the bones of other domestic animals, including man and chicken, is made. Drawings of the bones are made by the student in order that he may obtain a better mental picture of their shape and characteristic parts. The bones of the head are studied separately and collectively. Careful attention is given to the sinuses of the head and points of ossification. For convenience the horse is divided into three regions or parts for dissection; therefore, the one-third dissected during this semester may be any third of the subject, depending upon the part upon which the student is working.

106. ANATOMY II. Freshman year, second semester. Class work, three hours; dissection, twelve hours. Seven semester credits. Prerequisite: Anat. 101. Doctors Burt and McLeod.

This course is a continuation of the work begun in Anatomy 101. The course deals with myology and arthrology. The student is required to make a careful dissection of the muscles of the body, learning their location, attachments and relations one to another, as well as their relations to other important structures. After the muscles are dissected and learned the student dissects the ligaments of the various joints. The student also studies the viscera of the respective parts at the time of dissection of that part. Check cards and drawings indicating the different stages of dissection are kept, and the work is checked at frequent intervals.

111. ANATOMY III. Sophomore year, first semester. Class work, one hour; dissection, twelve hours. Five semester credits. Prerequisite: Anat. 106. Doctor Burt.

This course and Anatomy 116 consist of the study of angiology and neurology and all parts not previously dissected. Having had osteology and myology, the student is now prepared to get an accurate mental picture of the distribution, location and relation of the blood vessels and nerves. As in Anatomy II, the subject is divided into three parts. During this semester two parts will be dissected, leaving one part for Anatomy IV. Drawings are required as in Anatomy II.

116. ANATOMY IV. Sophomore year, second semester. Class work, one hour; dissecting, six hours. Three semester credits. Prerequisite: Anat. 111.

This course is a continuation of Anatomy 111. The student will now complete the dissection of every part of the subject, including special parts, as the foot, brain, eye, etc. In addition to the completion of the dissection of the horse, a comparative study of the principal structural differences of the various domestic animals, not studied concurrently with the previous courses, will now be made.

FOR GRADUATES AND UNDERGRADUATES

201. SPECIAL ANATOMY. Elective, first or second semester. Class work, one hour; dissection, nine hours. Four semester credits. Prerequisite: Any of the courses in Anatomy 101, 106, 111, 116, and 131, or their equivalent. Doctor Burt.

This course is adaptable to the requirements of the line of work in which the student is specializing. The work consists of the study of any part of the horse, as the digestive system, the genital system, etc., or may take up the study of similar parts of the ox, sheep, pig, etc. For any one so desiring, poultry anatomy may be chosen.

COURSES IN PHYSIOLOGY

FOR UNDERGRADUATES

121. COMPARATIVE PHYSIOLOGY I. Sophomore year, first semester. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Anat. 101 and 106, and Chem. 106. Doctors Burt and McLeod.

This course treats of the physiology of domestic animals, beginning with the study of the blood, heart, blood vessels, and continuing with the ductless glands and internal secretions, respirations, digestion, and absorption. Textbook: *A Manual of Veterinary Physiology*, by Fred Smith.

Laboratory.—The laboratory work consists of a practical application of the knowledge derived in the classroom. The laboratory is equipped with all necessary material and apparatus, such as hymographs, manometers, tambours, inductoriums, signal magnets, and electric clocks, to make the work interesting and practical, as well as instructive. Many

experiments are made by the students upon themselves, as well as upon the domestic animals. Graphic records are made by the students of the blood pressure, rate and amplitude of the pulse, and respiration; also the changes produced by stimulating certain nerves, exercise changes in position, the action of certain drugs, etc. The time of coagulation of the blood of various species of animals and the conditions that influence the rapidity of coagulation are considered. The secretion of the various digestive juices, the conditions that will influence the rate of their secretion and their actions are studied in detail. Laboratory directions are furnished the student. References: *Practical Physiology*, Pembry; Halliburton's *Essentials of Chemical Physiology*; *Manual of Physiology*, Stewart; *Urine of the Horse and Man*, Fish; and other standard textbooks on physiology.

126. COMPARATIVE PHYSIOLOGY II. Sophomore year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Doctors Burt and McLeod.

The work of this semester is a continuation of Anat. 121, and treats of the urine and urinary system, nutrition, animal heat, muscular and nervous symptoms, locomotion, generation and development, growth and decay. Textbook: Smith's *A Manual of Veterinary Physiology*

Laboratory.—The work done exemplifies the lectures given in the classroom. Graphic records are made of the normal muscle contraction, the changes brought about by fatigue, tetanus, variations in temperature, application of drugs, etc. The conductivity of the nerves, nerve blocking, the effects of anæsthetics upon the conductivity of the nerves, reflexes, and other phenomena relating to the nervous system are studied. The composition of the normal urine and the tests applicable for the detection of abnormal constituents in pathologic urine are carefully considered. Directions and references are the same as in the laboratory course in Comparative Physiology I.

FOR GRADUATES AND UNDERGRADUATES

215. RESEARCH IN PHYSIOLOGY. Elective, both semesters. Three to five semester credits. Prerequisites: Anat. 121, 126, and 131, or their equivalent. Doctor Burt.

Individual research problems in the physiology of digestion, reproduction, endocrin glands, etc., are assigned.

COURSE IN ANATOMY AND PHYSIOLOGY

FOR UNDERGRADUATES

131. ANATOMY AND PHYSIOLOGY. Sophomore year, first semester. Lectures and recitations, two hours; laboratory, three hours. Three semester credits. Doctor Burt.

This combined course is intended principally for students in agriculture, and treats chiefly of physiology of the domestic animals; however, sufficient anatomy is taught to enable the student to thoroughly comprehend the correlation between the two subjects, and the physiologic relations existing among the various organs of the body.

Special emphasis is placed on the physiology of digestion, absorption, metabolism, and excretion, so that the student may have a good foundation to understand the principles of feeding, etc., but due consideration is paid to the functions of the circulatory, respiratory, and nervous systems, etc. Text: Captain Fred Smith's *Manual of Veterinary Physiology*.

COURSE IN JURISPRUDENCE

FOR UNDERGRADUATES

161. JURISPRUDENCE. Senior year, second semester. Class work, one hour. One semester credit. Doctor Burt.

This course deals with the veterinarian's legal responsibilities, with national and state live-stock laws, quarantine regulations, etc.

Pathology

Assistant Professor LIENHARDT
Instructor SCOTT

Instructor VAWTER
Assistant KITSELMAN

The Department of Pathology presents courses in histology, pathology and meat inspection. The instruction is presented by lectures or recitations, laboratory periods, and demonstrations which are carried out by the use of the projectoscope, and by autopsies held on dead animals.

The laboratory is fully equipped and entirely up to date. The equipment consists of microtomes, paraffin ovens, microphotographic and projection apparatus, centrifuge, shaking machine, sterilizers, etc. Each student is furnished a drawer, microscope, prepared slides for study, and all other essentials needed for study in the laboratory courses.

The department is also in possession of quite a complete pathological museum, which contains specimens of organs and tissues that show lesions typical of the various infectious, and some non-infectious diseases. These specimens are used in the study of pathology and together with the specimens sent in from over the State and fresh material from the immediate vicinity they furnish ample material for the courses in pathology.

The department library contains text and reference books on pathology and allied subjects, also the current files of the important technical periodicals relating to pathology. These books are at the constant disposal of the student for reference.

The course in meat inspection together with the allied subjects required for a degree in veterinary medicine make the student eligible to take the civil-service examination for meat inspection. In this course advantage is taken of the local packing plant for instruction. Visits are also made to plants in Topeka and Kansas City.

COURSES IN HISTOLOGY

FOR UNDERGRADUATES

101. HISTOLOGY I. Freshman year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Doctors Lienhardt and Vawter.

The first part of the semester is spent upon the care and manipulation of the microscope, in the use of which the student must become proficient. This is followed by a microscopical examination of cotton, woolen, silk and linen fibers, bubbles of air, and drops of oil, to enable the student to recognize these when they are accidentally mounted with tissue. The fundamental tissues are next studied: epithelial tissues with regard to form, structure, arrangement and location; connective tissues with regard to structure and location, including bone development and teeth and their development; muscular tissue, voluntary, involuntary, and cardiac; nerve tissue, the structures and forms of its cells, of medullated and nonmedullated nerve fibers; spinal cord; the blood vessels, heart, and lymphatic vessels. Blood corpuscles are studied with regard to size, shape, and structure, including each kind of white corpuscles. Also, the blood-forming organs, as bone-marrow, lymph glands, and spleen, are studied. The histology of the digestive tract is studied, including study of the mouth, the tongue, the taste buds, the parotid, the submaxillary and sublingual, the thyroid and thymus glands, and the œsophagus. In this semester the student studies and mounts sixty-five slides, some of which are teased, and many of which are sectioned in paraffin and celloidin. Textbook: *Histology*, by Stohr, or *Histology*, by Bailey.

106. HISTOLOGY II. Freshman year, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Doctors Lienhardt and Vawter.

In this semester the student takes up the study of the stomachs of the dog, the horse, and the ox; the small intestines—duodenum, jejunum, and ileum; the large intestines—cæcum, colon, rectum and anus; liver, the pancreas, the respiratory tract—nasal mucous membrane, larynx, trachea, bronchi and lungs; the urinary organs—kidney, ureter, bladder, urethra; the male and female genital organs; the skin and its appendages; the suprarenal gland; the medulla; the cerebellum; the cerebrum; the eye; and the ear. During this semester the student stains, mounts, studies with microscope and makes drawings of the above-mentioned tissues. Some of the tissues studied are injected with gelatine mass to bring out the blood vessels. Textbook: *Histology*, by Stohr, or *Histology*, by Bailey.

FOR GRADUATES AND UNDERGRADUATES

225. SPECIAL HISTOLOGY. Second semester. Class work, one hour; laboratory, six hours. Three semester credits. Doctor Lienhardt.

This course is arranged to meet the requirements of those who are desirous of taking a histology course dealing with specific organs, as those concerned with digestion, respiration, etc. Tissues are fixed, dehydrated, imbedded, sectioned, stained, and mounted, and are studied after being properly prepared.

COURSES IN PATHOLOGY

FOR GRADUATES AND UNDERGRADUATES

201. PATHOLOGY I. Junior year, first semester. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Path. 106, Anat. 126, and Bact. 111. Doctors Lienhardt and Vawter.

The course in general pathology treats of the history of pathology, predisposition, immunity, congenital and inherited disease; circulatory disturbances—cardiac difficulties, hyperæmia, hemorrhage, dropsy, oedema, thrombosis, embolism, and alteration of the blood; disturbances in metabolism—fever, necrosis, atrophy, cloudy swelling, fatty changes, inflammation, calcification and concretum formation; and process of repair, tumors, and functional disturbances. Text: *Comparative General Pathology*, by Kitt.

206. PATHOLOGY II. Junior year, second semester. Class work, four hours; laboratory, six hours. Six semester credits. Doctors Lienhardt and Vawter.

This course is devoted to special pathology and pathological technique; collecting, fixing, hardening, embedding in celloidin and paraffin, sections of fresh, frozen, and embedded tissues; and a study of the method of preserving gross specimens. Considerable time is devoted to stains and the method of staining. This work is followed by special pathology, which includes the macroscopic and microscopic examination of the following tissues in all of the pathological conditions to which they are subject: cardiac muscle, skeletal muscle, the liver, the kidney, the bladder, the pancreas, the lungs, digestive tract, the serous membranes, the vascular system, lymph nodes, the spleen, bone, skin, and genital organs. The students stain, mount, study, and make drawings of the above-mentioned tissues. Textbooks: *Pathology*, by Delafield and Prudden; *Pathologische Anatomie*, by Kitt; and *Pathology*, Vol. II, by Adami and Nichols.

211. PATHOLOGY III. Senior year, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Doctors Lienhardt and Vawter.

This course is devoted to the pathology of the infectious diseases and to laboratory diagnosis. Post-mortem examinations are made on all

animals dying in the hospital at the College barns and in the neighborhood. The students attend and take turns in holding the autopsy. Each student is expected to keep a written report of the pathological changes, also of the microscopic findings. The above work is done under the direction of the pathologist in charge. Text: *Pathology of Infectious Diseases*, by Moore.

216. MEAT INSPECTION. Senior year, first semester. Class work, two hours. Two semester credits. Doctor Lienhardt.

The course in meat inspection is designed to prepare men for national, state, and local sanitary work, which is being more strongly urged and demanded every day. The kinds and classes of stock, the traffic and transportation of animals, their inspection before death, their slaughter, the normal conditions of healthy animals, the diseases discernible at the time of slaughter, the disposition of the condemned from economic, hygienic and sanitary standpoints, and different preparations and methods of preservation, adulterations, sanitary laws and regulations, and other points bearing upon the question of healthful meat production, are considered. Visits are made to the local slaughtering establishments, and to the large packing plants in Topeka, Kansas City or Wichita. Text: Edelman's *Meat Hygiene*, translated by Mohler and Eichorn.

FOR GRADUATES

301. PATHOLOGICAL TECHNIQUE AND DIAGNOSIS I. Elective, first and second semesters. Laboratory, six hours. Two semester credits. Prerequisite: Path. 211. Doctors Lienhardt and Vawter.

This course consists of practice in post-mortem and laboratory diagnosis. The various methods of embedding and staining tissues are carried out upon the large collection of material which the laboratory contains, as well as the material which is constantly coming into the laboratory from various parts of the State.

306. PATHOLOGICAL TECHNIQUE AND DIAGNOSIS II. Elective, first and second semesters. Laboratory, twelve hours. Four semester credits. Doctors Lienhardt and Vawter.

This course is a continuation of Path. 301.

Surgery and Medicine

Professor DYKSTRA
Associate Professor MULDOON
Instructor SCOTT

Instructor MCLEOD
Instructor FRICK

For instruction in surgery and clinic the equipment is excellent. The surgical amphitheater is an annex to the main Veterinary Building, seating over three hundred people, and equipped with every modern appliance for performing before the classes the most delicate operations upon both large and small animals. The hospital has a capacity of about thirty animals and is nearly always filled with patients, which give ample material for study of internal medicine as well. The out-clinic furnishes many cases yearly, giving the student opportunity to become familiar with the diseases and their treatment under the guidance of proficient practitioners.

For the study of materia medica and pharmacy there are a general pharmacy laboratory containing all the drugs used in the practice of veterinary medicine, and a practicing pharmacy where medicines are compounded for the everyday practice connected with the College.

COURSES IN SURGERY

FOR UNDERGRADUATES

101. SURGERY I. Junior year, first semester. Class work, three hours. Three semester credits. Doctor Dykstra.

This course includes methods of restraint; asepsis and antisepsis; anæsthesia, both local and general; inoculations, bandaging, massage, controlling hemorrhage; division of tissues and the uniting of wounds; injections of medicines into the subcutaneous tissues, blood streams, trachea, spinal canal. Animal dentistry is taken up very thoroughly, in so far as it constitutes an important part of the veterinarian's work. The students have free access to a large number of museum specimens of abnormal teeth. Also, many dental patients are presented at the College hospital for treatment.

106. SURGERY II. Junior year, second semester. Class work, three hours. Three semester credits. Doctor Dykstra.

This course considers in regular order the surgical diseases of the head, neck, thorax, abdomen, stomach and bowels, urinary organs, and organs of generation.

111. SURGERY III. Senior year, first semester. Class work, three hours. Three semester credits. Doctor Dykstra.

During this course particular attention is paid to causes, symptoms and treatment of lameness. It considers in detail fractures and their reduction, diseases of joints, tendons and sheaths, muscles and fascia, and surgical diseases of the foot.

116. SURGERY IV. Senior year, second semester. Class work, three hours. Three semester credits. Doctor Dykstra.

Surgery as taught during this course includes special operations, such as neurectomies, autoplasties, desmotomies, actual cauterization, tenotomies, myotomies, enterotomy and enteroanastomosis, and surgery of the eye. Reference books: Dollar's *Regional Veterinary Surgery*; Merillat's *Veterinary Surgery*, Vols. I, II, and III; Williams' *Surgical Operations*; Fleming's *Operative Veterinary Surgery*, Parts I and II; White's *Restraint of Domestic Animals*

121. OPERATIVE SURGERY. Senior year, second semester. Laboratory, three hours. One semester credit. Doctors Dykstra and Gingery.

Old horses are purchased by the department, placed on the operating table, anæsthetized, and over one hundred operations are performed on the animal. During this work the student is required to observe a careful technique, such as antisepsis, and, in fact, performs the operation as thoroughly and completely as possible. It is a very practical course and fits the student for surgical work in actual practice.

126. HORSESHOEING. Junior year and elective, second semester. Class work, one hour. One semester credit. Doctor McLeod.

The course is taught by means of lectures, recitations and demonstrations, taking up the various divisions in the following order: normal conformation in both limb and foot, the anatomy of these parts, physiological movements and correct normal shoeing. This is followed by a study of the proper shoeing for the correction of wry limbs and feet; diseases of the feet, and the relation of horseshoeing thereto. The course ends with the study of the shoeing of mules and oxen. Throughout the entire course the purpose is to instill in the mind of the student normal shoeing, in order that he may be able to correct abnormalities in the foot and limb in so far as this can be accomplished by shoeing. Reference books: Lungwitz's *Textbook of Horseshoeing*; Dollar's *Handbook of Horseshoeing*.

COURSES IN OBSTETRICS

FOR UNDERGRADUATES

131. OBSTETRICS. Senior year and elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Anat. 204 and Zoöl. 114, or Anat. 131 and Zoöl. 117. Doctor McLeod.

This course discusses in detail the physiology of pregnancy, anatomy of the generative organs, care and hygiene of pregnant animals, sterility, diseases incidental to pregnancy, diseases of new-born animals, care of new-born animals, abnormal presentations during parturition, surgery of obstetrics, etc. This work is supplemented by demonstrations on an obstetrical phantom and foetus; in addition, the College farm and surrounding agricultural territory furnish an abundance of actual material. References: Williams' *Veterinary Obstetrics*, Williams' *Surgical and Obstetrical Operations*, De Bruin's *Bovine Obstetrics*, and Fleming's *Veterinary Obstetrics*.

COURSES IN CLINICS

FOR UNDERGRADUATES

136. CLINICS I. Junior year, first semester. Laboratory, nine hours. Three semester credits. Doctors Dykstra, Muldoon, and Frick.

A free clinic which affords an abundance of material is conducted. All species of domesticated animals are presented for treatment. These patients are assigned in regular order to the senior students for diagnosis and treatment; clinic sheets are provided, on which are recorded the history, symptoms, pulse, temperature, respiration, diagnosis, prognosis, treatment, and the unsoundness, defects or blemishes of the animal. The clinician in charge discusses all the abnormal conditions present in the patient, thus assisting the student to develop his powers of observation. The junior students assist the senior students and, in addition, are required to master, by practical experience, the restraint of animals, bandaging, etc. The compounding of prescriptions, the preparation of anti-septics and other medicinal agents, is taken in charge by the junior students.

139. CLINICS II. Junior year, second semester. Laboratory, nine hours. Three semester credits. Doctors Dykstra, Muldoon, and Frick.

This work is a continuation of Clinics I.

142. CLINICS III. Senior year, first semester. Laboratory, twelve hours. Four semester credits. Doctors Dykstra, Muldoon, and Frick.

Patients left at the hospital for treatment are assigned to seniors, who are required to administer all medicines, change dressings of surgical wounds, etc. All work is performed under the direct supervision of the clinician in charge. Numerous country calls are received by the Division of Veterinary Medicine. These are taken care of by one of the clinicians, who is always accompanied by one or more senior students. This phase of the work is particularly valuable, as it gives the student practical experience under actual conditions.

145. CLINICS IV. Senior year, second semester. Laboratory, twelve hours. Four semester credits. Doctors Dykstra, Muldoon, and Frick.

This work is a continuation of Clinics III.

COURSES IN MATERIA MEDICA

FOR UNDERGRADUATES

151. MATERIA MEDICA I. Sophomore year, second semester. Class work, two hours. Two semester credits. Doctor Frick.

The course includes definitions of terms, modes of action of drugs in-

general, their method and rapidity of absorption and elimination, physiological and chemical incompatibles, etc. The drugs and medicinal agents are grouped according to their action. The lecturer discusses the origin, physical properties, active constituents, and official preparations of the medicinal agents.

156. MATERIA MEDICA II. Junior year, first semester. Class work, two hours. Two semester credits. Doctor Frick.

This course is a continuation of Materia Medica I.

161. THERAPEUTICS. Junior year, second semester. Class work, three hours. Three semester credits. Prerequisites: Materia Medica I and II. Doctor Frick.

The student is thoroughly drilled in the physiological action of the various drugs, or action on the healthy animal, and the therapeutic action, or action on the diseased animal. A course in toxicology is included in this work, taking up the symptoms and treatment of poisons frequently encountered in veterinary practice. The science of posology, or dosage, is considered of the utmost importance, and a liberal amount of time is devoted to it, taking up the proper dose of the crude drug and its preparation for the horse, cow, dog, cat, and swine. Reference works: *Milk's Practical Veterinary Pharmacology and Therapeutics*; *Froehner's Text-book of General Therapeutics*; *Winslow's Veterinary Materia Medica and Therapeutics*; *United States Dispensatory*; *Wood's Therapeutics, its Principles and Practice*.

166. PHARMACY. Junior year, first semester. Class and laboratory work, three hours. One semester credit. Doctor Frick.

In the lectures the meanings of the various pharmaceutical terms are discussed. Various systems of weights and measures, and the conversion of one system into another, are taught. Official preparation of each is studied in regular order. Particular stress is placed upon prescription writing, the student being taught to avoid incompatibilities, to give nouns the proper case ending, and to understand the meanings of certain Latin phrases. In the laboratory work the principles of filtration, percolation, hot-water and sand baths, etc., are taught. The student is required to prepare at least one of each of the following preparations: An infusion, a decoction, a tincture, a wine, a syrup, a fluid extract, a liniment, an emulsion, a liquor, an aqua, a spirit, an avolus, an ointment, an electuary, and a cataplasm. In addition, a thorough course in the compounding of prescriptions is afforded at the clinic, where all medicines are prescribed and compounded by the students, under guidance of the instructor in charge. Reference works: *U. S. Pharmacopœia*; *Maltbie's Practical Pharmacy*; *Remington's Practice of Pharmacy*; *Fish's Exercises in Materia Medica and Pharmacy*.

COURSES IN MEDICINE

FOR UNDERGRADUATES

170. DIAGNOSIS. Junior year, first semester. Class work, two hours. Two semester credits. Doctor Muldoon.

This is a course preparatory to the study of medicine proper. It takes up in detail the different diagnostic methods employed for the detection of diseases, including auscultation, percussion, palpation, and inspection, and also treats of the normal and abnormal abdominal and thoracic sounds, and considers in detail the specific examination of the various organs, including diagnostic inoculations as an aid to the detection of disease.

173. MEDICINE I. Junior year, second semester. Class work, four hours. Four semester credits. Doctor Muldoon.

The noninfectious diseases of the respiratory organs are studied in this course, taking up in regular order the nasal and accessory cavities the larynx, bronchi, lungs, and pleura.

176. MEDICINE II. Senior year, first semester. Class work, five hours. Five semester credits. Doctor Muldoon.

This course is devoted to noninfectious diseases of the mouth, salivary glands, œsophagus, stomach and intestines, liver, pancreas, and peritoneum. This is followed by diseases of the urinary organs, of the circulatory organs, diseases of metabolism, of the nervous system, of the organs of locomotion, and of the skin.

180. MEDICINE III. Senior year, second semester. Class work, five hours. Five semester credits. Doctor Muldoon.

In contradistinction to the preceding courses in medicine, the distinctly infectious and contagious diseases of domesticated animals are discussed. The following order is usually adopted: Acute general infectious diseases, acute exanthematous infectious diseases, acute infectious diseases with localization in certain organs, infectious diseases with special involvement of the nervous system, chronic infectious diseases, infectious diseases produced by protozoa. In addition particular attention is given to propagation and spread of infectious diseases, predisposing and exciting causes of disease, general sanitation, etc.

183. OPHTHALMOLOGY. Senior year, second semester. Class work, one hour. One semester credit. Doctor Scott.

This course discusses the method of conducting examinations of the eye by means of the ophthalmoscope, illumination of the eye, and the use of drugs as an aid to this process; and acute and chronic diseases of the eye.

Reference books for the courses in medicine: Hutyra and Marek's *Pathology of the Diseases of Domestic Animals*, Vols. I and II; Friedberger and Frohner's *Veterinary Pathology*, Vols. I and II; Law's *Veterinary Medicine*, Vols. I, II, III, IV, and V; Moussu and Dollar's *Diseases of Cattle*; Glass' *Diseases of the Dog*; Cadiot's *Clinical Veterinary Medicine*.

190. FARM ANIMALS IN HEALTH AND IN DISEASE. Elective, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Anat. 131. Doctor Frick.

First-aid treatment of diseases of domestic animals. Understanding of contagious and non-contagious diseases. Special emphasis given to the cause and prevention of disease in farm animals. Study of the domestic animals in relation to their surroundings; the healthy animal. Text: Craig's *Common Diseases of Farm Animals*.

Division of Engineering

ANDREY ABRAHAM POTTER, *Dean*

The Division of Engineering offers curricula in agricultural engineering, architecture, civil engineering, electrical engineering, flour-mill engineering, and mechanical engineering, each leading to the degree of bachelor of science in the profession selected.

While the curricula, as scheduled, are believed to be sufficient to cover the needs of the average young man, it is possible to combine portions of the work of two or more of them in such a way that one may be prepared to take up a special line of work for which he desires to fit himself. For example, by substituting certain courses from the departments of chemistry and geology for some of those in the curriculum in mechanical engineering, a young man can fit himself for work in connection with the manufacture of cement. By substituting some of the courses in chemistry for others in mechanical engineering, a special preparation can be secured for chemical engineering. By combining some of the courses in civil and mechanical engineering and by taking additional work in chemistry and geology, a young man may fit himself for special work in connection with the development of the coal fields of the country. By combining courses in architecture and civil engineering, specialization in architectural engineering may be secured. In special cases permission will be granted to combine the work on the lines here indicated. With the permission of the dean of the division, students desiring to do so may substitute work in military engineering for certain subjects in any of the curricula of the division.

It is believed that the curricula as tabulated give the best preparation for students expecting to follow general work in the profession selected, and for those who are not certain what particular branch of the profession they will follow. The substitutions and combinations indicated, and others similar to them, will be permitted only when there is good evidence that the student desiring such work is practically certain to follow the branch selected.

In the case of any of these modifications, the degree granted will be that of the course in which the major portion of the work is taken. In no case will the substitution of an additional amount of technical work for any of the general cultural work in the course be allowed.

Besides the four-year professional curricula, the Division of Engineering offers:

A three-year curriculum in mechanic arts in the School of Agriculture, with trade practice electives in blacksmithing, carpentry, concrete construction, and stationary and traction engines, and

Short special courses for automobile mechanics, tractor operators, carpenters, machinists, blacksmiths, electricians, and foundrymen.

These are all discussed elsewhere in this catalogue.

CURRICULUM IN AGRICULTURAL ENGINEERING

The curriculum in agricultural engineering is designed to qualify men for engineering work in rural communities; for positions in the farm-machinery and farm-motor industry; for the management of farms where drainage, irrigation or power-farming methods are prevalent; and for the positions of advisors, consulting engineers or architects in connection with farm buildings and equipment.

The work of the first year is the same as in the other engineering curricula. During the last three years about one-third of the time is devoted to agricultural subjects, in order to familiarize the students with the modern methods of scientific agriculture and to enable them to apply engineering principles to agricultural problems in a practical way. Considerable time is also devoted to farm machinery, farm motors, rural architecture, highway engineering, irrigation, drainage, and concrete construction.

The agricultural engineering students are also given considerable training in drawing, shop practice, physics, chemistry, surveying, steam engineering, gas engineering, and electrical engineering.

CURRICULUM IN ARCHITECTURE

The curriculum in architecture aims to provide the technical training which will give a broad and sound foundation for the needs of the practicing architect, as well as the essentials of a liberal education. Although closely associated with, and somewhat dependent upon, science and engineering, architecture is primarily a fine art; hence the training of the architect, while including the general fundamentals of engineering and science, must be based primarily upon a study and understanding of the basic architectural principles together with the canons of art and good taste. A major portion of the curriculum is therefore devoted to the study of architectural design, supplemented by those subjects preparatory or contributory to it.

Supporting this line of study the student is given a comprehensive view of the development of civilization together with a more detailed study of the history of architecture and of art. Throughout the course draughtsmanship as applied to architectural design and construction, as well as to free-hand drawing and sketching, is given constant attention. Courses dealing with the fundamental principles of building construction, sanitation, heating and lighting, together with a careful study of the properties and uses of building materials, are given simultaneously with the courses in design and drawing.

In addition to the above-outlined professional and technical studies, approximately one-quarter of the curriculum is devoted to more general studies designed to broaden the student's view and to give him the essentials of a liberal education. Thus it is the aim not only to provide a fundamental training upon which the student may base his professional development and advancement, but to afford a training which is in the broadest sense educational.

CURRICULUM IN CIVIL ENGINEERING

The aim of the curriculum in civil engineering, as outlined in this catalogue, is to give the young men taking the work the best possible preparation for entering upon the active practice of the profession under present conditions. It will be noted that the first and second years are devoted largely to general culture studies and the sciences, including mathematics. This follows the arrangement generally found in the engineering curricula of American colleges, and it finds its justification in the well-nigh universally accepted idea that any engineering education worthy of consideration must be grounded upon ample preliminary education in the allied sciences. An introduction to the technical work is given in these years through courses in drawing, shopwork, surveying, and the elementary phases of engineering.

The last two years are devoted largely to technical work. In recognition of the mechanical trend of the age, liberal provision is made for class and laboratory work in mechanical and electrical engineering. In view of the growing importance of municipal problems, such as paving, sewerage, and water-supply, the curriculum in civil engineering includes required courses in these subjects.

Advanced elective courses in railway, highway, and irrigation and drainage engineering are offered in the second semester of the senior year.

CURRICULUM IN ELECTRICAL ENGINEERING

The essential elements underlying a sound engineering training are based upon a thorough study of mathematics and the physical sciences. These studies, together with introductory courses in drawing, shopwork, surveying, and the elementary phases of engineering, occupy most of the time of the first two years. The professional work of this curriculum begins in the junior year and continues throughout the last two years. General culture subjects are included in the work of each of the four years.

Emphasis is placed upon training to deal with the forces and matter according to scientific principles, rather than upon the accumulation of facts. The department laboratories are well equipped with the various measuring instruments, standardizing apparatus, and different types of dynamo machinery. The different subjects are presented in the classroom, and the classroom work is supplemented by laboratory practice. The curriculum provides a liberal training in wood- and iron-working, mechanical drawing, and machine-shop practice.

The laboratory experiments selected for the students are designed to give a clear conception of the theoretical work of the classroom.

Students are given extensive practice in connecting up the different types of machines for testing purposes and for standard commercial work. This practice work and testing extends throughout the junior and senior years, and is intended to give the student familiarity with the underlying principles of the different machines, and a knowledge of the care necessary to operate them successfully. Opportunity is also given to undertake the investigation of commercial problems as they are sent to the College from the different central stations of the State.

CURRICULUM IN FLOUR-MILL ENGINEERING

The milling of wheat and other cereals is an important industry in this State. The curriculum in flour-mill engineering is designed to prepare men for the management of mills, for work in connection with the designing of milling plants, and for research work in the preparation and utilization of mill products.

The work of the freshman year is the same as in the other engineering courses. The sophomore year is similar to that of the mechanical engineering course, but includes additional chemistry and a beginning course in milling practice. In the junior and senior years, besides the courses dealing with the production, marketing, testing, and milling of grain products, a considerable amount of time is devoted to mechanics, chemistry, history, economics, business law and organization, steam and gas engineering, and flour-mill design.

CURRICULUM IN MECHANICAL ENGINEERING

The work in mechanical engineering prepares for the successful management and superintendence of factories and power plants; for the design of power and machinery installations; for the design and construction of machine tools, steam and gas engines, compressors, hydraulic machinery, etc.; and for the design and erection of engineering buildings and factories, including the selection, purchasing, and location of the equipment.

The curriculum has been laid out with the aim of securing a judicious mixture of theory and practice, such as will not only give the student the technical skill required for engineering operations, but will also endow him with an understanding of the scientific and economic principles necessary for the solution of engineering and industrial problems.

Throughout the four years the theoretical studies in the classroom are supplemented by the practical work in the laboratories in such a manner as very materially to strengthen both. In the materials and machinery testing laboratories the work does not end when the test is completed, but the entire problem must be written up in such a manner as would be approved in the best commercial testing laboratories. The laboratory work in the shops not only gives the student practice in performing the machining and various other mechanical operations, but includes a scientific study of the factors of production, so that the loss of material and expenditure of human effort will be a minimum.

The professional courses in mechanical engineering are given mainly in the departments of steam and gas engineering, shop practice, and applied mechanics and machine design.

Students pursuing a mechanical engineering curriculum are urged to spend at least two summers in some shop or commercial plant in order to broaden their training.

Curriculum in Agricultural Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours of recitation each week; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | |
|------------------------|--------|
| Chemistry E-I | |
| Chem. 107 | 4(3-3) |
| Plane Trigonometry | |
| Math. 101 | 3(3-0) |
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Engineering Drawing | |
| Ap. Mech. 155 | 2(0-6) |
| Surveying I | |
| Civ. Engr. 102 | 2(0-6) |
| Extempore Speech I | |
| Pub. Spk. 106 | 2(2-0) |
| Military Science I | |
| Mil. Tr. 101 | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101 | R |
| Physical Education M-I | |
| Phys. Ed. 103 | R(0-2) |

| SECOND SEMESTER | |
|-------------------------|--------|
| Chemistry E-II | |
| Chem. 108 | 4(3-3) |
| College Algebra | |
| Math. 104 | 3(3-0) |
| College Rhetoric II | |
| Engl. 104 | 3(3-0) |
| Descriptive Geometry | |
| Ap. Mech. 158 | 2(0-6) |
| Surveying II | |
| Civ. Engr. 111 | 2(0-6) |
| Woodwork | |
| Shop 101 | 1(0-3) |
| Forging I | |
| Shop 150 | 1(0-3) |
| Military Science II | |
| Mil. Tr. 102 | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101 | R |
| Physical Education M-II | |
| Phys. Ed. 104 | R(0-2) |

SOPHOMORE

| FIRST SEMESTER | |
|-----------------------------|-----------|
| Engineering Physics I | |
| Physics 145 | 5(4-3) |
| Plane Analytical Geometry | |
| Math. 110 | 4(4-0) |
| American Industrial History | |
| Hist. 105 | 3(3-0) |
| Organic Chemistry | |
| Chem. 120 | 3(2-3) or |
| { Metallurgy | |
| Shop 165 | 2(2-0) } |
| { Forging II | |
| Shop 155 | 1(0-3) } |
| Mechanical Drawing I | |
| Ap. Mech. 161 | 2(0-6) |
| Military Science III | |
| Mil. Tr. 103 | 1(0-4) |
| Seminar | |
| Gen. Engr. 105 | R |
| Physical Education M-III | |
| Phys. Ed. 105 | R(0-2) |

| SECOND SEMESTER | |
|-------------------------|--------|
| Engineering Physics II | |
| Physics 150 | 5(4-3) |
| Calculus I | |
| Math. 113 | 5(5-0) |
| Farm Crops | |
| Agron. 103 | 4(3-3) |
| Field Machinery | |
| Farm Engr. 106, 107 .. | 2(1-3) |
| Foundry Practice | |
| Shop 160 | 1(0-3) |
| Military Science IV | |
| Mil. Tr. 104 | 1(0-4) |
| Seminar | |
| Gen. Engr. 105 | R |
| Physical Education M-IV | |
| Phys. Ed. 106 | R(0-2) |

JUNIOR

| FIRST SEMESTER | |
|---|--------|
| Applied Mechanics I | |
| Ap. Mech. 101, 105 .. | 4(3-3) |
| Calculus II | |
| Math. 116 | 3(3-0) |
| Soils | |
| Agron. 131 | 4(3-3) |
| Farm Motors | |
| Farm Engr. 125, 126 .. | 3(2-3) |
| Market Grades and Classes of Live Stock | |
| An. Husb. 131 | 3(1-6) |
| Seminar | |
| Gen. Engr. 105 | R |

| SECOND SEMESTER | |
|------------------------|-----------|
| Applied Mechanics E-II | |
| Ap. Mech. 115, 120 .. | 4(3-3) |
| Economics | |
| Econ. 101 | 3(3-0) |
| Power Machinery | |
| Farm Engr. 111, 112 .. | 2(1-3) |
| Kinematics | |
| Ap. Mech. 180 | 3(3-0) |
| Tractors and Trucks | |
| Farm Engr. 116, 117 .. | 3(2-3) or |
| Mechanical Drawing II | |
| Ap. Mech. 170 | 3(0-9) or |
| Hydraulics | |
| Ap. Mech. 130, 135 .. | 4(3-3) |
| Machine Tool Work I | |
| Shop 170 | 2(0-6) |
| Seminar | |
| Gen. Engr. 105 | R |

SENIOR

| FIRST SEMESTER | SECOND SEMESTER |
|------------------------------|-----------------------------------|
| Farm Management | Drainage and Irrigation I |
| Ag. Ec. 106..... 3(2-3) | Civ. Engr. 161..... 2(2-0) |
| Principles of Feeding | Engineering English |
| An. Husb. 152..... 3(3-0) | Engl. 110 2(2-0) |
| Rural Architecture | Electrical Engineering C |
| Farm Engr. 102..... 3(0-9) | Elect. Engr. 160, 165.. 3(2-2, 1) |
| Highway Engineering I | Concrete Construction |
| Civ. Engr. 230 and Ap. | Ap. Mech. 140, 145.... 2(1-3) |
| Mech. 250 3(2-3) | Steam and Gas Engineering C |
| Business Law I | Steam and Gas 120, 125, 3(2-3) |
| Hist. 153 1(1-0) | Elements of Dairying |
| Business Organization | Dairy Husb. 101..... 3(2-3) or |
| Econ. 106 1(1-0) | Soil Fertility |
| Advanced Farm Machinery | Agron. 132 3(2-2, 1) |
| Farm Engr. 130..... 2(0-6) | |
| Pattern Making | |
| Shop 145 1(0-3) | |
| Seminar | Seminar |
| Gen. Engr. 105..... R | Gen. Engr. 105..... R |
| Thesis | Thesis |
| Ap. Mech. 150, Civ. Engr. | Ap. Mech. 150, Civ. Engr. |
| 170, Farm Engr. 175, Shop | 170, Farm Engr. 175, Shop |
| 195, or Steam and Gas 195, R | 195, or Steam and Gas 195, R |

Curriculum in Architecture

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | SECOND SEMESTER |
|-----------------------------|------------------------------|
| Plane Trigonometry | College Algebra |
| Math. 101 3(3-0) | Math. 104 3(3-0) |
| Perspective | Shades and Shadows |
| Arch. 127 2(0-6) | Arch. 130 2(0-6) |
| College Rhetoric I | College Rhetoric II |
| Engl. 101 3(3-0) | Engl. 104 3(3-0) |
| Engineering Drawing | Descriptive Geometry |
| Ap. Mech. 2(0-6) | Ap. Mech. 158..... 2(0-6) |
| Freehand Drawing I | Freehand Drawing II |
| Arch. 111 2(0-6) | Arch. 114 2(0-6) |
| Architectural Drawing I | Architectural Drawing II |
| Arch. 108 2(0-6) | Arch. 109 2(0-6) |
| Materials of Construction I | Materials of Construction II |
| Arch. 135 2(2-0) | Arch. 138 2(2-0) |
| Military Science I | Military Science II |
| Mil. Tr. 101..... 1(0-4) | Mil. Tr. 102..... 1(0-4) |
| Engineering Lectures | Engineering Lectures |
| Gen. Engr. 101..... R | Gen. Engr. 101..... R |
| Physical Education M-I | Physical Education M-II |
| Phys. Ed. 103..... R(0-2) | Phys. Ed. 104..... R(0-2) |

SOPHOMORE

FIRST SEMESTER

| | |
|---------------------------------------|-----------|
| Engineering Physics I | |
| Physics 145 | 5(4-2, 1) |
| French I | |
| Mod. Lang. 151 | 3(3-0) |
| History of Architecture I | |
| Arch. 153 | 2(2-0) |
| Working Drawings and Specifications I | |
| Arch. 168 | 2(0-6) |
| Freehand Drawing III | |
| Arch. 116 | 2(0-6) |
| Design I | |
| Arch. 142 | 3(0-9) |
| Military Science III | |
| Mil. Tr. 103 | 1(0-4) |
| Seminar | |
| Gen. Engr. 105 | R |
| Physical Education M-III | |
| Phys. Ed. 105 | R(0-2) |

SECOND SEMESTER

| | |
|--|-----------|
| Engineering Physics II | |
| Physics 150 | 5(4-2, 1) |
| French II | |
| Mod. Lang. 152 | 3(3-0) |
| History of Architecture II | |
| Arch. 156 | 2(2-0) |
| Working Drawings and Specifications II | |
| Arch. 169 | 2(0-6) |
| Freehand Drawing IV | |
| Arch. 117 | 2(0-6) |
| Design II | |
| Arch. 144 | 3(0-9) |
| Military Science IV | |
| Mil. Tr. 104 | 1(0-4) |
| Seminar | |
| Gen. Engr. 105 | R |
| Physical Education M-IV | |
| Phys. Ed. 106 | R(0-2) |

JUNIOR

FIRST SEMESTER

| | |
|-----------------------------|---------|
| Applied Mechanics A-I | |
| Ap. Mech. 102 | 3(3-0) |
| Graphic Statics | |
| Ap. Mech. 125 | 1(0-3) |
| History of Architecture III | |
| Arch. 159 | 2(2-0) |
| Freehand Drawing V | |
| Arch. 118 | 2(0-6) |
| Design III | |
| Arch. 145 | 5(0-15) |
| Elective* | 5(-) |
| Seminar | |
| Gen. Engr. 105 | R |

SECOND SEMESTER

| | |
|----------------------------|---------|
| Applied Mechanics A-II | |
| Ap. Mech. 116, 121 | 4(3-3) |
| History of Architecture IV | |
| Arch. 161 | 2(2-0) |
| Freehand Drawing VI | |
| Arch. 120 | 2(0-6) |
| Design IV | |
| Arch. 147 | 5(0-15) |
| Elective* | 5(-) |
| Seminar | |
| Gen. Engr. 105 | R |

SENIOR

FIRST SEMESTER

| | |
|------------------------|---------|
| Civilization and Art I | |
| Arch. 183 | 3(3-0) |
| Freehand Drawing VII | |
| Arch. 121 | 2(0-6) |
| Design V | |
| Arch. 148 | 8(0-24) |
| Domestic Architecture | |
| Arch. 172 | 2(0-6) |
| Economics | |
| Econ. 101 | 3(3-0) |
| Seminar | |
| Gen. Engr. 105 | R |

SECOND SEMESTER

| | |
|-------------------------|---------|
| Civilization and Art II | |
| Arch. 185 | 3(3-0) |
| Freehand Drawing VIII | |
| Arch. 123 | 2(0-6) |
| Design VI | |
| Arch. 151 | 8(0-24) |
| Office Practice | |
| Arch. 191 | 3(3-0) |
| Engineering English | |
| Engl. 110 | 2(2-0) |
| Seminar | |
| Gen. Engr. 105 | R |

* Electives are to be chosen with the advice and approval of the Dean of the Division and the Professor of Architecture.

Curriculum in Civil Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | |
|---|--------|
| Chemistry E-I Chem. 107 | 4(3-3) |
| Plane Trigonometry Math. 101 | 3(3-0) |
| College Rhetoric I Engl. 101 | 3(3-0) |
| Engineering Drawing Ap. Mech. 155 | 2(0-6) |
| Surveying I Civ. Engr. 102 | 2(0-6) |
| Extempore Speech I Pub. Spk. 106 | 2(2-0) |
| Military Science I Mil. Tr. 101 | 1(0-4) |
| Engineering Lectures Gen. Engr. 101 | R |
| Physical Education M-I Phys. Ed. 103 | R(0-2) |

| SECOND SEMESTER | |
|--|--------|
| Chemistry E-II Chem. 108 | 4(3-3) |
| College Algebra Math. 104 | 3(3-0) |
| College Rhetoric II Engl. 104 | 3(3-0) |
| Descriptive Geometry Ap. Mech. 158 | 2(0-6) |
| Surveying II Civ. Engr. 111 | 2(0-6) |
| Woodwork Shop 101 | 1(0-3) |
| Forging I Shop 150 | 1(0-3) |
| Military Science II Mil. Tr. 102 | 1(0-4) |
| Engineering Lectures Gen. Engr. 101 | R |
| Physical Education M-II Phys. Ed. 104 | R(0-2) |

SOPHOMORE

| FIRST SEMESTER | |
|---|--------|
| Engineering Physics I Physics 145 | 5(4-3) |
| Plane Analytical Geometry Math. 110 | 4(4-0) |
| American Industrial History Hist. 105 | 3(3-0) |
| Surveying III Civ. Engr. 151, 155 | 3(2-3) |
| Mechanical Drawing I Ap. Mech. 161 | 2(0-6) |
| Military Science III Mil. Tr. 103 | 1(0-4) |
| Seminar Gen. Engr. 105 | R |
| Physical Education M-III Phys. Ed. 105 | R(0-2) |

| SECOND SEMESTER | |
|--|--------|
| Engineering Physics II Physics 150 | 5(4-3) |
| Calculus I Math. 113 | 5(5-0) |
| Metallurgy Shop 165 | 2(2-0) |
| Surveying IV Civ. Engr. 156, 157 | 3(2-3) |
| (Civil Engineering Drawing I Civ. Engr. 125 | 2(0-6) |
| Military Science IV Mil. Tr. 104 | 1(0-4) |
| Seminar Gen. Engr. 105 | R |
| Physical Education M-IV Phys. Ed. 106 | R(0-2) |

JUNIOR

| FIRST SEMESTER | |
|---|--------|
| Applied Mechanics I Ap. Mech. 101, 105 | 4(3-3) |
| Calculus II Math. 116 | 3(3-0) |
| Engineering Geology Geol. 102 | 4(2-6) |
| Masonry and Foundations Civ. Engr. 120 | 2(2-0) |
| Economics Econ. 101 | 3(3-0) |
| Business Law I Hist. 153 | 1(1-0) |
| Seminar Gen. Engr. 105 | R |

| SECOND SEMESTER | |
|---|--------|
| Applied Mechanics II Ap. Mech. 110, 120 | 6(5-3) |
| Hydraulics Ap. Mech. 130, 135 | 4(3-3) |
| Railway Engineering I Civ. Engr. 145 | 2(2-0) |
| Drainage and Irrigation I Civ. Engr. 161 | 2(2-0) |
| Steam and Gas Engineering C Steam and Gas 120, 125, 3(2-3) | |
| Seminar Gen. Engr. 105 | R |

SENIOR

FIRST SEMESTER

| | |
|------------------------------|--------|
| Bridge Stresses | |
| Civ. Engr. 201..... | 4(4-0) |
| Civil Engineering Drawing II | |
| Civ. Engr. 205..... | 2(0-6) |
| Astronomy and Geodesy | |
| Civ. Engr. 210, 215.... | 4(3-3) |
| Water Supply | |
| Civ. Engr. 220..... | 2(2-0) |
| Sewerage | |
| Civ. Engr. 225..... | 2(2-0) |
| Highway Engineering I | |
| Civ. Engr. 230 and | |
| Ap. Mech. 250..... | 3(2-3) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Ap. Mech. 150 <i>or</i> | |
| Civ. Engr. 170..... | R |

SECOND SEMESTER

| | |
|----------------------------|------------------|
| Bridge Design | |
| Civ. Engr. 246..... | 3(0-9) |
| Electrical Engineering C | |
| Elect. Engr. 160, 165... | 3(2-2, 1) |
| Engineering English | |
| Engl. 110 | 2(2-0) |
| Business Organization | |
| Econ. 106 | 1(1-0) |
| Concrete Design | |
| Civ. Engr. 250, 255.... | 3(2-3) |
| Railway Engineering II | |
| Civ. Engr. 260, 265.... | 4(2-6) <i>or</i> |
| Highway Engineering II | |
| Civ. Engr. 270, 275.... | 4(2-6) <i>or</i> |
| Drainage and Irrigation II | |
| Civ. Engr. 280, 285.... | 4(2-6) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Ap. Mech. 150 <i>or</i> | |
| Civ. Engr. 170..... | R |

Curriculum in Electrical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER

| | |
|---------------------------------------|------------------|
| Chemistry E-I | |
| Chem. 107 | 4(3-3) |
| Plane Trigonometry | |
| Math. 101 | 3(3-0) |
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Engineering Drawing | |
| Ap. Mech. 155..... | 2(0-6) |
| Extempore Speech I | |
| Pub. Spk. 106..... | 2(2-0) |
| Electrical Machinery and Construction | |
| Elect. Engr. 170..... | 2(0-6) <i>or</i> |
| Surveying I | |
| Civ. Engr. 102..... | 2(0-6) |
| Military Science I | |
| Mil. Tr. 101..... | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101..... | R |
| Physical Education M-I | |
| Phys. Ed. 103..... | R(0-2) |

SECOND SEMESTER

| | |
|---------------------------------------|------------------|
| Chemistry E-II | |
| Chem. 108 | 4(3-3) |
| College Algebra | |
| Math. 104 | 3(3-0) |
| College Rhetoric II | |
| Engl. 104 | 3(3-0) |
| Descriptive Geometry | |
| Ap. Mech. 158..... | 2(0-6) |
| Woodwork | |
| Shop 101 | 1(0-3) |
| Forging I | |
| Shop 150 | 1(0-3) |
| Surveying I | |
| Civ. Engr. 102..... | 2(0-6) <i>or</i> |
| Electrical Machinery and Construction | |
| Elect. Engr. 170..... | 2(0-6) |
| Military Science II | |
| Mil. Tr. 102..... | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101..... | R |
| Physical Education M-II | |
| Phys. Ed. 104..... | R(0-2) |

SOPHOMORE

FIRST SEMESTER

| | |
|---------------------------|--------|
| Engineering Physics I | |
| Physics 145 | 5(4-3) |
| Plane Analytical Geometry | |
| Math. 110 | 4(4-0) |
| Kinematics | |
| Ap. Mech. 180..... | 3(2-0) |
| Mechanical Drawing I | |
| Ap. Mech. 161..... | 2(0-6) |
| Metallurgy | |
| Shop 165 | 2(2-0) |
| Forging II | |
| Shop 155 | 1(0-3) |
| Military Science III | |
| Mil. Tr. 103..... | 1(0-4) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Physical Education M-III | |
| Phys. Ed. 105..... | R(0-2) |

SECOND SEMESTER

| | |
|-----------------------------|--------|
| Engineering Physics II | |
| Physics 150 | 5(4-3) |
| Calculus I | |
| Math. 113 | 5(5-0) |
| American Industrial History | |
| Hist. 105 | 3(3-0) |
| Mechanical Drawing II | |
| Ap. Mech. 170..... | 3(0-9) |
| Foundry Practice | |
| Shop 160 | 1(0-3) |
| Military Science IV | |
| Mil. Tr. 104..... | 1(0-4) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Physical Education M-IV | |
| Phys. Ed. 106..... | R(0-2) |

JUNIOR

FIRST SEMESTER

| | |
|---------------------------|-----------|
| Applied Mechanics I | |
| Ap. Mech. 101, 105.... | 4(3-3) |
| Calculus II | |
| Math. 116 | 3(3-0) |
| Economics | |
| Econ. 101 | 3(3-0) |
| Direct-Current Machines I | |
| Elect. Engr. 101, 105... | 4(3-2, 1) |
| Electrical Measurements | |
| Elect. Engr. 121, 126... | 2(1-2, 1) |
| Pattern Making | |
| Shop 145 | 1(0-3) |
| Seminar | |
| Gen. Engr. 105..... | R |

SECOND SEMESTER

| | |
|--------------------------------|-----------|
| Applied Mechanics E-II | |
| Ap. Mech. 115, 120.... | 4(3-3) |
| Hydraulics | |
| Ap. Mech. 130, 135.... | 4(3-3) |
| Direct-Current Machines II | |
| Elect. Engr. 110, 115... | 4(3-2, 1) |
| Alternating-Current Machines I | |
| Elect. Engr. 201, 205... | 3(2-2, 1) |
| Machine Tool Work I | |
| Shop 170 | 2(0-6) |
| Seminar | |
| Gen. Engr. 105..... | R |

SENIOR

FIRST SEMESTER

| | |
|---------------------------------|-----------|
| Steam and Gas Engineering I | |
| Steam and Gas 101, 105, 5(4-3) | |
| Alternating-Current Machines II | |
| Elect. Engr. 210, 215... | 6(4-4, 2) |
| Electrical Machine Design I | |
| Elect. Engr. 150..... | 1(0-3) |
| Telephony | |
| Elect. Engr. 220, 225... | 3(2-3) |
| Factory Engineering | |
| Shop 245, 250..... | 2(1-3) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Elect. Engr. 195..... | R |

SECOND SEMESTER

| | |
|--------------------------------|--------|
| Steam and Gas Engineering II | |
| Steam and Gas 110, 115, 4(3-3) | |
| Electric Railways | |
| Elect. Engr. 240..... | 2(2-0) |
| Electrical Machine Design II | |
| Elect. Engr. 155..... | 2(0-6) |
| Illuminating Engineering | |
| Elect. Engr. 235, 236... | 3(2-3) |
| Business Law I | |
| Hist. 153 | 1(1-0) |
| Business Organization | |
| Econ. 106 | 1(1-0) |
| Engineering English | |
| Engl. 110 | 2(2-0) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Elect. Engr. 195..... | R |

Curriculum in Flour-mill Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER

| | |
|------------------------|--------|
| Chemistry E-I | |
| Chem. 107 | 4(3-3) |
| Plane Trigonometry | |
| Math. 101 | 3(3-0) |
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Extempore Speech I | |
| Pub. Spk. 106 | 2(2-0) |
| Engineering Drawing | |
| Ap. Mech. 155 | 2(0-6) |
| Woodwork | |
| Shop 101 | 1(0-3) |
| Forging I | |
| Shop 150 | 1(0-3) |
| Military Science I | |
| Mil. Tr. 101 | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101 | R |
| Physical Education M-I | |
| Phys. Ed. 103 | R(0-2) |

SECOND SEMESTER

| | |
|---------------------------------|--------|
| Chemistry E-II | |
| Chem. 108 | 4(3-3) |
| College Algebra | |
| Math. 104 | 3(3-0) |
| College Rhetoric II | |
| Engl. 104 | 3(3-0) |
| Descriptive Geometry | |
| Ap. Mech. 158 | 2(0-6) |
| Elements of Steam and Gas Power | |
| Steam and Gas 130 | 2(0-6) |
| Surveying I | |
| Civ. Engr. 102 | 2(0-6) |
| Military Science II | |
| Mil. Tr. 102 | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101 | R |
| Physical Education M-II | |
| Phys. Ed. 104 | R(0-2) |

SOPHOMORE

FIRST SEMESTER

| | |
|---------------------------|-----------|
| Engineering Physics I | |
| Physics 145 | 5(4-3) |
| Plane Analytical Geometry | |
| Math. 110 | 4(4-0) |
| Organic Chemistry | |
| Chem. 120 | 3(2-2, 1) |
| Business Law I | |
| Hist. 153 | 1(1-0) |
| Mechanical Drawing I | |
| Ap. Mech. 161 | 2(0-6) |
| Quantitative Analysis I | |
| Chem. 150 | 2(0-6) |
| Military Science III | |
| Mil. Tr. 103 | 1(0-4) |
| Seminar | |
| Gen. Engr. 105 | R |
| Physical Education M-III | |
| Phys. Ed. 105 | R(0-2) |

SECOND SEMESTER

| | |
|-------------------------|--------|
| Engineering Physics II | |
| Physics 150 | 5(4-3) |
| Calculus I | |
| Math. 113 | 5(5-0) |
| Kinematics | |
| Ap. Mech. 180 | 3(3-0) |
| Mechanical Drawing II | |
| Ap. Mech. 170 | 3(0-9) |
| Principles of Milling | |
| Mill. Ind. 101 | 1(0-3) |
| Military Science IV | |
| Mil. Tr. 104 | 1(0-4) |
| Seminar | |
| Gen. Engr. 105 | R |
| Physical Education M-IV | |
| Phys. Ed. 106 | R(0-2) |

JUNIOR

FIRST SEMESTER

| | |
|--------------------------------|--------|
| Applied Mechanics I | |
| Ap. Mech. 101, 105 | 4(3-3) |
| Calculus II | |
| Math. 116 | 3(3-0) |
| Advanced Quantitative Analysis | |
| Chem. 260 | 2(0-6) |
| Grain Crop Production | |
| Agron. 101 | 3(2-3) |
| Grain Marketing | |
| Mill. Ind. 102 | 3(3-0) |
| Machine Tool Work I | |
| Shop 170 | 2(0-6) |
| Seminar | |
| Gen. Engr. 105 | R |

SECOND SEMESTER

| | |
|------------------------|--------|
| Applied Mechanics E-II | |
| Ap. Mech. 115, 120 | 4(3-3) |
| Hydraulics | |
| Ap. Mech. 130, 135 | 4(3-3) |
| Economics | |
| Econ. 101 | 3(3-0) |
| Grain Products | |
| Mill. Ind. 103 | 2(2-0) |
| Milling Practice I | |
| Mill. Ind. 109 | 3(1-6) |
| Milling Entomology | |
| Ent. 116 | 1(1-0) |
| Seminar | |
| Gen. Engr. 105 | R |

SENIOR

FIRST SEMESTER

| | |
|--------------------------------|--------|
| Wheat and Flour Testing | |
| Mill. Ind. 203..... | 4(1-9) |
| Flour Mill Design | |
| Ap. Mech. 215..... | 2(0-6) |
| Steam and Gas Engineering I | |
| Steam and Gas 101, 105, 5(4-3) | |
| American Industrial History | |
| Hist. 105..... | 3(3-0) |
| Business Organization | |
| Econ. 106..... | 1(1-0) |
| Factory Engineering | |
| Shop 245, 250..... | 2(1-3) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Ap. Mech. 150, Shop 195 or | |
| Steam and Gas 195..... | R |

SECOND SEMESTER

| | |
|---|--------|
| Experimental Baking A | |
| Mill. Ind. 204..... | 2(0-6) |
| Milling Practice II | |
| Mill. Ind. 110..... | 2(0-6) |
| Steam and Gas Engineering II | |
| Steam and Gas 110, 115, 4(3-3) | |
| Refrigeration, Heating, and Ventilation | |
| Steam and Gas 210, 215, 3(2-3) | |
| Electrical Engineering C | |
| Elect. Engr. 160, 165... 3(2-2, 1) | |
| Engineering English | |
| Engl. 110..... | 2(2-6) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Ap. Mech. 150, Shop 195 or | |
| Steam and Gas 195..... | R |

Curriculum in Mechanical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER

| | |
|---------------------------------|--------|
| Chemistry E-I | |
| Chem. 107..... | 4(3-3) |
| Plane Trigonometry | |
| Math. 101..... | 3(3-0) |
| College Rhetoric I | |
| Engl. 101..... | 3(3-0) |
| Engineering Drawing | |
| Ap. Mech. 155..... | 2(0-6) |
| Extempore Speech I | |
| Pub. Spk. 106..... | 2(2-0) |
| Woodwork | |
| Shop 101..... | 1(0-3) |
| Forging I | |
| Shop 150..... | 1(0-3) |
| Elements of Steam and Gas Power | |
| Steam and Gas 130.... | 2(0-6) |
| Military Science I | |
| Mil. Tr. 101..... | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101..... | R |
| Physical Education M-I | |
| Phys. Ed. 103..... | R(0-2) |

SECOND SEMESTER

| | |
|---------------------------------|-----------|
| Chemistry E-II | |
| Chem. 108..... | 4(3-3) |
| College Algebra | |
| Math. 104..... | 3(3-0) |
| College Rhetoric II | |
| Engl. 104..... | 3(3-0) |
| Descriptive Geometry | |
| Ap. Mech. 158..... | 2(0-6) |
| Surveying I | |
| Civ. Engr. 102..... | 2(0-6) |
| Elements of Steam and Gas Power | |
| Steam and Gas 130.... | 2(0-6) or |
| Woodwork | |
| Shop 101..... | 1(0-3) |
| Forging I | |
| Shop 150..... | 1(0-3) |
| Military Science II | |
| Mil. Tr. 102..... | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101..... | R |
| Physical Education M-II | |
| Phys. Ed. 104..... | R(0-2) |

SOPHOMORE

FIRST SEMESTER

| | |
|---------------------------|--------|
| Engineering Physics I | |
| Physics 145 | 5(4-3) |
| Plane Analytical Geometry | |
| Math. 110 | 4(4-0) |
| Kinematics | |
| Ap. Mech. 180..... | 3(3-0) |
| Mechanical Drawing I | |
| Ap. Mech. 161..... | 2(0-6) |
| Metallurgy | |
| Shop 165 | 2(2-0) |
| Forging II | |
| Shop 155 | 1(0-4) |
| Military Science III | |
| Mil. Tr. 103..... | 1(0-3) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Physical Education M-III | |
| Phys. Ed. 105..... | R(0-2) |

SECOND SEMESTER

| | |
|-----------------------------|--------|
| Engineering Physics II | |
| Physics 160 | 5(4-3) |
| Calculus I | |
| Math. 113 | 5(5-0) |
| American Industrial History | |
| Hist. 105 | 3(3-0) |
| Mechanical Drawing II | |
| Ap. Mech. 170..... | 3(0-9) |
| Foundry Practice | |
| Shop 160 | 1(0-3) |
| Military Science IV | |
| Mil. Tr. 104..... | 1(0-4) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Physical Education M-IV | |
| Phys. Ed. 106..... | R(0-2) |

JUNIOR

FIRST SEMESTER

| | |
|--------------------------------|--------|
| Applied Mechanics I | |
| Ap. Mech. 101, 105.... | 4(3-3) |
| Calculus II | |
| Math. 116 | 3(3-0) |
| Steam and Gas Engineering I | |
| Steam and Gas 101, 105, 5(4-3) | |
| Business Law I | |
| Hist. 153 | 1(1-0) |
| Mechanical Drawing III | |
| Ap. Mech. 175..... | 1(0-3) |
| Graphic Statics | |
| Ap. Mech. 125..... | 1(0-3) |
| Machine Tool Work I | |
| Shop 170 | 2(0-6) |
| Seminar | |
| Gen. Engr. 105..... | R |

SECOND SEMESTER

| | |
|--------------------------------|--------|
| Applied Mechanics II | |
| Ap. Mech. 110, 120.... | 6(5-3) |
| Hydraulics | |
| Ap. Mech. 130, 135.... | 4(3-3) |
| Steam and Gas Engineering II | |
| Steam and Gas 110, 115, 4(3-3) | |
| Pattern Making | |
| Shop 145 | 1(0-3) |
| Machine Tool Work II | |
| Shop 192 | 2(0-6) |
| Seminar | |
| Gen. Engr. 105..... | R |

SENIOR

FIRST SEMESTER

| | |
|----------------------------|-----------|
| Electrical Engineering M-I | |
| Elect. Engr. 130, 135... | 4(3-2, 1) |
| Power Plant Engineering | |
| Steam and Gas 206.... | 3(0-9) |
| Machine Design I | |
| Ap. Mech. 201, 205.... | 5(3-6) |
| Factory Engineering | |
| Shop 245, 250..... | 2(1-3) |
| Economics | |
| Econ. 101 | 3(3-0) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Ap. Mech. 150, Shop 195 or | |
| Steam and Gas 195..... | R |

SECOND SEMESTER

| | |
|--|-----------|
| Electrical Engineering M-II | |
| Elect. Engr. 140, 145... | 4(3-2, 1) |
| Refrigeration, Heating and Ventilation | |
| Steam and Gas 210, 215, 3(2-3) | |
| Machine Design II | |
| Ap. Mech. 210..... | 2(0-6) |
| Factory Design | |
| Shop 255 | 2(0-6) |
| Engineering English | |
| Engl. 110 | 2(2-0) |
| Business Organization | |
| Econ. 204 | 1(1-0) |
| Machine Tool Work III | |
| Shop 193 | 1(0-3) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Ap. Mech. 150, Shop 195 or | |
| Steam and Gas 195..... | R |

Applied Mechanics and Machine Design

Professor SEATON
Associate Professor WENDT
Assistant Professor PEARCE
Testing Engineer SCHOLEK
Instructor ROBERT

Instructor SMUTZ
Instructor DURLAND
Instructor _____
Instructor _____
Assistant BUDDEN

The courses in applied mechanics deal with the applications of the laws of the mechanics of solids and liquids to the problems of engineering. Graphical and analytical methods of analysis are used for determining the forces acting on the parts of structures or machines, either at rest or in motion, and the effects of these forces in causing stresses, deformations, or motions of the parts.

The work is intended to be of a highly practical character, based on a sound theoretical training. For the purpose of fixing in the mind of the student the principles taught, the solution of a large number of problems is required. The principles are further illustrated by means of the laboratory and drafting-room work, which parallels the classroom instruction.

The laboratory exercises also permit the student to observe at first hand the behavior of materials, machines, and apparatus under test and to become familiar with testing apparatus and methods. All tests of a commercial character are conducted in accordance with the standard methods prescribed by the national societies. Complete reports are required on all laboratory exercises.

The courses in drawing are intended to teach students to read and interpret drawings, to express themselves clearly and accurately in the graphical language, and to use this as a powerful aid in the development of plans and the analysis of problems. Commercial drafting-room methods of representation are used for all working drawings.

APPLIED MECHANICS LABORATORIES*

The strength of materials testing laboratory is provided with a number of universal testing machines, including a 200,000 pound Olsen machine with extension members for testing long beams and columns. Among the other pieces of apparatus are a 250,000-inch-pound torsion-testing machine, a beam-testing machine, an Upton-Lewis toughness-testing machine, a Brinnell hardness machine, a scleroscope, and a very complete equipment of extensometers and other auxiliary apparatus for use with these machines. A complete set of standard test weights from one grain to 600 pounds total capacity is provided for calibrating the weighing apparatus.

The cement and concrete laboratory contains full equipment for making standard and research tests on cements, sands, gravels, and concretes, including several automatic shot cement-testing machines, sieves, needles, ovens, tanks, moist closets, scales, and a large number of briquette and cylindrical molds for test specimens. It also contains con-

* These laboratories have been designated by law as the official testing laboratories for the State Highway Commission of Kansas.

crete building-block machines, and molds for various cast concrete products, such as drainage tile and fence posts.

The road materials testing laboratory contains apparatus for making all the usual tests and many special tests on stone, brick, and bituminous road materials. All of the equipment used in testing road materials for the State Highway Commission is available for student use.

HYDRAULICS LABORATORY

The hydraulics laboratory contains two hydraulic pits each of 25,000 gallons capacity, equipped with various types of weirs, an air-pressure tank, hydraulic rams, several centrifugal pumps, one 15-inch Layne and Bowler three-stage deepwell centrifugal pump, a positive rotary pump, a deepwell reciprocating pump, a water motor, a Pelton-Doble water wheel, a Trump water turbine, current meters, electric motors for driving the pumps, and many pieces of small apparatus, such as an orifice tank, weirs, scales, tanks, hook gauges, pressure gauges, pressure regulators, water meters including a 6-inch Venturi meter, and manometers.

COURSES IN APPLIED MECHANICS

FOR UNDERGRADUATES

101. APPLIED MECHANICS I RECITATION. Junior year, first semester and summer school. Class work, three hours. Three semester credits. Prerequisites: Calculus I (Math. 113) and Engineering Physics II (Physics 212). Professor Seaton, Associate Professor Wendt, and Mr. Robert.

A study is made of the analytical and graphical composition, resolution, and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; friction; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motions; and of work, energy, and power. Text: Poorman's *Applied Mechanics*.

102. APPLIED MECHANICS A-I RECITATION. Junior year, first semester. Class work, three hours. Three semester credits. Prerequisites: Analytical Geometry (Math. 110), and Engineering Physics I (Physics 211). Professor Seaton and Associate Professor Wendt.

This course comprises a study of statics, with applications to stresses in structures; center of gravity; and moment of inertia. Algebraic methods are generally employed, supplemented by graphic construction and numerous examples.

105. APPLIED MECHANICS I LABORATORY. Junior year, first semester and summer school. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics I Recitation. Associate Professor Wendt and Mr. Robert.

Exercises are given in the calibration and use of laboratory measuring instruments and apparatus, such as micrometers, planimeters, dynamometers, platform scales, jacks, hoists and various types of testing machines. Standard tests are also made on cement. Text: Carpenter and Diederichs' *Experimental Engineering*. (This text is also used in the subsequent laboratory courses in applied mechanics and hydraulics, and in steam and gas engineering.)

110. APPLIED MECHANICS II RECITATION. Junior year, second semester and summer school. Class work, five hours. Five semester credits. Prerequisite: Applied Mechanics I. Professor Seaton, Associate Professor Wendt, and Mr. Robert.

Behavior of materials subjected to tension, compression, and shear; riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of simple and continuous beams and cantilevers; bending moments and shear forces in beams; design of beams of wood, steel and reinforced concrete; design of built-up beams and box girders; resilience of beams; stresses in columns and hooks; and the design of columns of wood, steel and reinforced concrete. Texts: *Boyd's Strength of Materials* and *Hool's Reinforced Concrete Construction*, Vol. I. *Cambria Steel* is used for reference.

115. APPLIED MECHANICS E-II RECITATION. Junior year, second semester and summer school. Class work, three hours. Three semester credits. Prerequisite: Applied Mechanics I. Professor Seaton, Associate Professor Wendt, and Mr. Robert.

The subject matter of this course is similar to that of Applied Mechanics II, but much less time is devoted to the study of continuous girders and of reinforced concrete. Text: *Boyd's Strength of Materials*. *Cambria Steel* is used for reference.

116. APPLIED MECHANICS A-II RECITATION. Junior year, second semester. Class work, three hours. Three semester credits. Prerequisites: Applied Mechanics A-I Recitation. Professor Seaton and Associate Professor Wendt.

Behavior of materials subjected to tension, compression, and shear; strength and stiffness of simple beams; moment and shear in flexure of beams, with diagrams; design of beams of wood, steel and reinforced concrete and design and investigation of columns.

120. APPLIED MECHANICS II OR E-II LABORATORY. Junior year, second semester and summer school. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics II or E-II Recitation. Professor Seaton, Associate Professor Wendt, and Mr. Robert.

Tension, compression, shear and bending tests are made on specimens of iron, steel, wood, and concrete. These include standard commercial tests and tests to determine the elastic properties of the materials. Torsion tests are also made on steel shafting. Standard tests are made on fine and coarse aggregates for concrete, and on brick.

121. APPLIED MECHANICS A-II LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics A-II Recitation. Associate Professor Wendt and Mr. Robert.

This course comprises the use of micrometers, planimeters, and slide rules and a study of the various testing machines. Tension, compression, shear, and bending tests are made on specimens of iron, steel, wood, and concrete. Tests are also made on cement and on the fine and coarse aggregates for concrete.

125. GRAPHIC STATICS. Junior year, first semester. Drafting-room practice, supplemented by lectures, three hours. One semester credit. Must accompany or follow Applied Mechanics I or A-I. Professor Seaton and Associate Professor Wendt.

Graphical solutions are made of the stresses existing in a number of typical trusses, under a variety of loadings, and a detail design is made of one of the simpler forms of roof trusses.

130. HYDRAULICS RECITATION. Junior year, both semesters. Class work, three hours. Three semester credits. Must accompany or follow Applied Mechanics I. Professor Seaton and Mr. Robert.

A study of fluid pressure, stresses in containing vessels and pipes, center of pressure, immersion and flotation; Bernoulli's theorem, with applications; flow through orifices, weirs, short and long pipes; loss of

head due to various causes; flow of water in open channels, and its measurement; Kutter's formula; impulse and reaction of a jet; elements of water power, impulse wheels, reaction turbines, and centrifugal pumps. Text: Daugherty's *Hydraulics*.

135. **HYDRAULICS LABORATORY** Junior year, both semesters. Laboratory work, three hours. One semester credit. Must accompany or follow Hydraulics Recitation (Ap. Mech. 130). Associate Professor Wendt and Mr. Robert.

Tests to determine the coefficients of weirs and orifices; use and calibration of water meters; tests to determine loss of head in pipes due to various causes, and tests on water wheels, water turbines, rams, and pumps.

140. **CONCRETE CONSTRUCTION RECITATION.** Senior year and elective, both semesters. Lectures and recitations, one hour. One semester credit. Professor Seaton and Associate Professor Wendt.

Instruction is given in the principles governing the selection and preparation of materials, the proper proportioning of materials for different conditions, the construction of forms, mixing and handling concrete, elementary reinforced concrete construction, finishing concrete surfaces, stucco and plaster work, and the waterproofing and coloring of concrete. A brief study is made of the application of these principles to the making of concrete foundations, building blocks and bricks, posts, sidewalks, floors, tanks, cisterns, silos, and bridges and culverts. Text: Seaton's *Concrete Construction for Rural Communities*.

145. **CONCRETE CONSTRUCTION LABORATORY.** Senior year and elective, both semesters. Laboratory work, three hours. One semester credit. This course must accompany or follow Concrete Construction Recitation (Ap. Mech. 140). Associate Professor Wendt and Mr. Budden.

Laboratory and field work is given in hand and machine mixing and handling of concrete, and in the construction of forms, for such objects as machine and building foundations, floors, sidewalks, fence posts, and building blocks. Tests are made on concrete cylinders and beams to illustrate the effect of different methods of treatment on the strength and reliability of plain and reinforced concrete.

150. **THESIS.** Senior year, continuing through the year. Professor Seaton, Associate Professor Wendt, Assistant Professor Pearce, and Mr. Robert.

The laboratories of the department furnish an excellent opportunity for experimental work in strength of materials, road materials, concrete and hydraulics, suitable for thesis projects of students in any branch of engineering. Projects in machine design may also be worked out as theses. The subject of the investigation should be selected in consultation with the head of the department at the beginning of the first semester of the senior year.

FOR GRADUATES AND UNDERGRADUATES

250. **HIGHWAY ENGINEERING I LABORATORY.** Senior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Applied Mechanics II Laboratory. Associate Professor Wendt and Testing Engineer Scholer.

This is a comprehensive course in the examination and testing of bituminous and nonbituminous road materials.

255. **ADVANCED APPLIED STATICS.** Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II or E-II. Professor Seaton.

This course includes advanced problems in equilibrium of forces and stresses in framed structures, including certain statically indeterminate cases.

260. ADVANCED APPLIED KINETICS. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II or E-II. Professor Seaton.

Advanced problems in kinetics are given with special attention to the kinetics of rigid bodies.

265. ADVANCED MECHANICS OF MATERIALS. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II or E-II. Professor Seaton or Associate Professor Wendt.

A study is made of the theory of elasticity and its applications, of elastic and masonry arches, and advanced problems in continuous girders involving the general three moment equations.

270. HYDRAULIC MACHINERY. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Hydraulics. Associate Professor Wendt and Mr. Robert.

A study is made of the characteristics and applications of water wheels, turbines, pumps, and other hydraulic machinery.

275. ROAD MATERIALS. Elective, first or second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Highway Engineering I Laboratory. Associate Professor Wendt and Testing Engineer Scholer.

An advanced course in the properties and testing of the various materials used in road construction is here given.

FOR GRADUATES.

301. RESEARCH IN MATERIALS OF CONSTRUCTION. Elective, first or second semester. One semester credit for each three hours of laboratory work. Professor Seaton and Associate Professor Wendt.

Many problems related to materials used in engineering construction offer attractive fields for research. A number of special pieces of apparatus in addition to the usual equipment of strength of materials laboratory are available for this work. The results of such investigations, if suitable, may be incorporated in bulletins of the Engineering Experiment Station.

COURSES IN DRAWING AND MACHINE DESIGN

FOR UNDERGRADUATES

155. ENGINEERING DRAWING. Freshman year, both semesters and summer school. Drafting, supplemented by lectures and recitations, six hours. Two semester credits. Mr. Smutz, Mr. Durland, and assistants.

Instruction is given in the selection and use of drawing instruments, construction of geometrical figures, lettering, orthographic projections and sections, and pictorial methods of representation. Text: French's *Engineering Drawing*.

158. DESCRIPTIVE GEOMETRY. Freshman year, both semesters and summer school. Drafting practice with lectures and recitations, six hours. Two semester credits. Prerequisites: Engineering Drawing and Solid Geometry. Mr. Smutz, Mr. Durland, and assistants.

In this course, which is a continuation of Engineering Drawing, more advanced problems, involving the point, line, and plane; the intersection and development of the surfaces of geometric solids; single-curved, and double-curved surfaces, with their sections, tangents and tangent planes, as well as the practical applications of the principles involved, are studied. Emphasis is laid on developing the student's ability to visualize drawings in the third angle. Text: Smith's *Practical Descriptive Geometry*.

161. **MECHANICAL DRAWING I.** Sophomore year, both semesters and summer school. Drafting, with lectures and recitations, six hours. Two semester credits. Prerequisite: Descriptive Geometry. Assistant Professor Pearce and Mr. Durland.

A study is made of conventional representations, working drawings, modern drafting-room systems, and the reproduction of drawings. Additional practice is given in the inclined Gothic and Reinhardt systems of lettering. Working drawings, both detail and assembly, are made from assigned plates. Special emphasis is given to the proper selection of views to present the necessary information in convenient forms, dimensioning, checking for errors, and the subject matter and arrangement of titles and notes. Text: French's *Engineering Drawing*.

170. **MECHANICAL DRAWING II.** Sophomore and junior years, second semester and summer school. Drafting, nine hours. Three semester credits. Prerequisites: Mechanical Drawing I. Kinematics (Ap. Mech. 180) must accompany or precede this course. Assistant Professor Pearce and Mr. Durland.

About one-half of the time is occupied in making free-hand sketches of simple machine parts and complete working drawings from these sketches without further reference to the objects. At least one drawing is traced, and a blue print made from the tracing. The remainder of the semester is devoted to kinematic problems, including belting, cams, linkages, and gears to fulfill specified conditions. Center line drawings are first made, embodying the solution of the problems, and upon these are built working drawings of the machine parts. An effort is made to follow standard practice in the design of those details usually determined by empirical methods. Displacement and velocity diagrams are drawn for linkages and cams.

175. **MECHANICAL DRAWING III.** Junior year, first semester. Drafting, three hours. One semester credit. Prerequisite: Mechanical Drawing II. Steam and Gas Engineering I (Steam and Gas 101) must accompany or precede this course. Assistant Professor Pearce.

This includes the solution of a problem on the slide valve by the Bilgram diagram, followed by the design, mostly by empirical methods, of the cylinder, piston, steam chest, and valve of a steam engine. All calculations and sketches are carefully kept in note books. Kent's *Mechanical Engineers' Pocketbook* and Mark's *Mechanical Engineers' Handbook* are extensively used for reference, and each student is expected to have a copy of one of these books. Manufacturers' catalogues and blue prints are also used for reference.

180. **KINEMATICS.** Sophomore and junior years, both semesters and summer school. Lectures and recitations, three hours. Three semester credits. Prerequisites: Plane Trigonometry (Math. 101) and Descriptive Geometry (Ap. Mech. 158). Professor Seaton, Assistant Professor Pearce, and Mr. Durland.

A careful study is made of the fundamental elements of machinery with reference to the transmission of motion and force, and to their forms and arrangements in actual machines. Among the subjects discussed are: bearings; screws; worms and wheels; rolling cylinders, cones and discs; belts, ropes, and chains; cams, levers, and linkwork, with their motion, velocity, and force diagrams; special forms of linkages, such as quick return and straight-line motions; gear-tooth outlines, and trains of gears. The solution of a large number of graphical and mathematical problems is required in this course. Text: Schwamb and Merrill's *Elements of Mechanism*.

FOR GRADUATES AND UNDERGRADUATES

201. **MACHINE DESIGN I RECITATION.** Senior year, first semester. Lectures and recitations, three hours. Three semester credits. Prerequisites: Applied Mechanics II and Mechanical Drawing II (Ap. Mech. 110,

170); Steam and Gas Engineering II (Steam and Gas 110). Must accompany Machine Design I Laboratory (Ap. Mech. 205). Professor Seaton and Assistant Professor Pearce.

A study is made of the straining actions in machine elements in general, with special attention to the design of springs, riveted fastenings, screw fastenings, keys, force fits, cylinders, plates, journals, bearings, shafting, clutches, couplings, and belt, rope, chain and gear transmissions. Some time is devoted to a study of friction and lubrication, to the action of reciprocating parts in engines, and to the problems arising in the design of high-speed machinery. Text: Leutwiler's *Machine Design* and Lanza's *Dynamics of Machinery*.

205. MACHINE DESIGN I LABORATORY. Senior year, first semester. Drafting, six hours. Two semester credits. Must accompany Machine Design I Recitation (Ap. Mech. 201). Professor Seaton and Assistant Professor Pearce.

A steam boiler is designed in strict conformity to the A. S. M. E. Boiler Code. Calculations are made for all parts except standard fittings, and working drawings are made. In the latter part of the course designs are made for a large pulley, shaft, and shaft coupling. All calculations and sketches are kept in note books.

210. MACHINE DESIGN II. Senior year, second semester. Drafting, six hours. Two semester credits. Prerequisites: Machine Design I (Ap. Mech. 201, 205). Professor Seaton and Assistant Professor Pearce.

This is a continuation of Machine Design I Laboratory. A small power shear is designed. Calculations are made for all parts, and a graphical analysis is made of the stresses in the shaft. Working drawings are made.

215. FLOUR-MILL DESIGN. Senior year, first semester. Drafting, supplemented by lectures and assigned reading, six hours. Two semester credits. Prerequisites: Applied Mechanics E-II (Ap. Mech. 115) and Milling Practice I (Mill. Ind. 201). Professor Seaton and Mr. ———.

A design is made for a medium capacity flour mill, including the selection and the planning of the arrangement of the machinery.

Architecture

Professor BAKER
Professor WALTERS (Emeritus)

Assistant Professor SMITH
Instructor ———

The courses in architecture are offered not only to provide for the fundamental training necessary for the practice of architecture, but also to give the student a facility and working knowledge which will be of immediate value to him upon graduation. The foundation which the student acquires in college should be supplemented by continual professional study, especially during those years immediately following graduation, when it is desirable that he should acquire practical experience in the employ and under the guidance of capable and experienced members of the profession. Students are most urgently advised to acquire practical experience in an architect's office during the summer vacations of their college course.

Throughout the course the instruction by lectures, recitations and drafting-room practice is fully amplified and expanded by a free use of the equipment of the Department of Architecture. Within the department is housed a good working library of the standard architectural works and leading professional magazines, together with the collections

of lantern slides and photographs, to all of which the student has free access. Placed about the amply lighted and well-equipped rooms of the department is a generous collection of plaster casts, including important examples of architectural fragments and ornament from historical monuments. On the walls of the drafting rooms, where they are constantly before the student, are hung selected examples from the department's collection of original drawings, including specimens of both academic and current professional work. From time to time this exhibit is changed.

At frequent intervals, representative men actually engaged in the practice of architecture and the allied arts and trades are invited to talk to and to advise the student. During the junior or senior year, under the direction of and in company with a member of the departmental faculty, each student is expected to make a visit to one or more of the neighboring cities, thus enabling him to acquaint himself with the representative work of the profession as well as with the operations and processes involved in the conduct of allied professions and industries.

All drawings or designs made during the student's course are to become the property of the department, to be used or returned at the discretion of the faculty.

COURSES IN ARCHITECTURE

FOR UNDERGRADUATES

108. ARCHITECTURAL DRAWING I. Freshman year, first semester. Drafting room, six hours. Two semester credits. Professor Baker and Assistant Professor Smith.

This course is outlined to give the student a working knowledge of architectural drafting-room practice, with a view to fitting him to enter an architect's office his first summer in college. The work covers the different methods of presenting architectural drawings, lettering, and the various symbols used in architectural practice. Special attention is given to the study of fundamental forms and their presentation.

109. ARCHITECTURAL DRAWING II. Freshman year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Course 108. Professor Baker and Assistant Professor Smith.

This is a continuation of Architectural Drawing I, and consists of a more detailed study of architectural forms, in preparation for Design I in the sophomore year. Text: Pierre Esquire's *Traite Elementaire d'Architecture Comprenant l'Etude Complete des Cinq Ordres*.

111. FREE-HAND DRAWING I. Freshman year, first semester. Drafting room, six hours. Two semester credit. Mr. ———.

This course comprises the drawing of simple objects and groups as exercises in developing the powers of observation as well as in training the hand. Special attention is given to representations of the third dimension.

114. FREE-HAND DRAWING II. Freshman year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 111. Mr. ———.

This is an amplification and expansion of the principles taught in Free-hand Drawing I, as applied to architectural forms and architectural ornament. The work consists of drawing in charcoal or pencil from casts.

116. FREE-HAND DRAWING III. Sophomore year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 114. Mr. ———.

This is a continuation of Free-hand Drawing II, and consists of drawing from casts of architectural ornament and of the human figure, with occasional exercises in rapid sketching.

117. FREE-HAND DRAWING IV. Sophomore year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 116. Mr. _____.

In this course Free-hand Drawing III is continued.

118. FREE-HAND DRAWING V. Junior year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 117. Mr. _____.

This is a continuation of Free-hand Drawing III and IV, and consists of a more detailed study and rendering in charcoal of architectural ornament and the human figure. More time is given than in the previous course to rapid sketching in pencil and pen and ink, as well as to drawing from memory.

120. FREE-HAND DRAWING VI. Junior year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 118. Mr. _____.

In this course Free-hand Drawing V is continued.

121. FREE-HAND DRAWING VII. Senior year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 120. Mr. _____.

This is a continuation of Free-hand Drawing V and VI, but gives more time to the drawing of the human figure and to practice in original composition, as well as to sketching in water color.

123. FREE-HAND DRAWING VIII. Senior year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 121. Mr. _____.

In this course Free-hand Drawing VII is continued.

127. PERSPECTIVE Freshman year, first semester. Drafting room, six hours. Two semester credits. To be taken simultaneously with Ap. Mech. 155 and Arch. 108. Assistant Professor Smith.

This course, consisting of drafting-room exercises and examinations, covers the study and practical application of the theory of perspective as related to architectural practice. In the latter part of the course drafting-room exercises are given to train the student to visualize, in perspective, objects represented in orthographic projection.

130. SHADES AND SHADOWS Freshman year, second semester. Drafting room, six hours. Two semester credits. Prerequisites: Ap. Mech. 155, and Arch. 108, 127. To be taken simultaneously with Ap. Mech. 158 and Arch. 109. Assistant Professor Smith.

The course consists of a series of drafting-room exercises and examinations, applying the principles of descriptive geometry in casting conventional architectural shadows. In these exercises the student is required to give careful consideration to the elemental architectural forms and principles of rendering used in his study of this subject. Text: McGoodwin's *Architectural Shades and Shadows*.

135. MATERIALS OF CONSTRUCTION I. Freshman year, first semester. Class work, two hours. Two semester credits. Assistant Professor Smith.

This is a recitation course covering the study of the properties and uses of the various building materials, together with the conditions and limitations under which they may be used in different types of building construction. Text: Kidder's *Building Construction and Superintendence*, Vols. I and II.

138. MATERIALS OF CONSTRUCTION II. Freshman year, second semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 135. Assistant Professor Smith.

In this course Materials of Construction I is continued.

142. DESIGN I. Sophomore year, first semester. Drafting room, nine hours. Three semester credits. Prerequisites: Arch. 114, 126, and 129. Professor Baker, Assistant Professor Smith, and Mr. ———.

This course is outlined to develop the student's understanding of architectural composition and his ability to present architectural conceptions, thus laying the foundation for his esthetic training. By means of problems in original design, accompanied by a constant study and analysis of the best historical examples, the student is led to develop his sense of proportion and conception of beauty, at the same time acquiring through the training of hand and eye a facility in architectural composition and rendering. In this course each student receives individual instruction, accompanied by frequent criticisms of students' work before the entire class.

144. DESIGN II. Sophomore year, second semester. Drafting room, nine hours. Three semester credits. Prerequisite: Arch. 142. Professor Baker, Assistant Professor Smith, Mr. ———.

In this course Design I is continued.

145. DESIGN III. Junior year, first semester. Drafting room, fifteen hours. Five semester credits. Prerequisites: Arch. 117 and 144. Professor Baker.

This is a continuation of Design I and II. At frequent intervals during the year, time problems or rapid design sketches are required to test the student's development and to give him practice in clear and concise expression. It is also required that at least one problem be presented in perspective.

147. DESIGN IV. Junior year, second semester. Drafting room, fifteen hours. Five semester credits. Prerequisites: Arch. 145. Professor Baker.

In this course Design III is continued.

148. DESIGN V. Senior year, first semester. Drafting room, twenty-four hours. Eight semester credits. Prerequisites: Arch 120 and 147. Professor Baker.

In this course Design IV is continued.

151. DESIGN VI. Senior year, second semester. Drafting room, twenty-four hours. Eight semester credits. Prerequisite: Arch. 148. Professor Baker.

In this course Design V is continued.

153. HISTORY OF ARCHITECTURE I. Sophomore year, first semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 114. Assistant Professor Smith.

This is a lecture and recitation course covering the history of architecture from the dawn of civilization to the end of the Roman Empire. Throughout the courses in the history of architecture the relation of architecture to the development of civilization is constantly emphasized. The lectures are given with the aid of lantern slides, and written papers, with sketches, are required of each student.

156. HISTORY OF ARCHITECTURE II. Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 153. Assistant Professor Smith.

This course continues History of Architecture I and covers the period from the end of the Roman Empire to the end of the Gothic Period.

159. HISTORY OF ARCHITECTURE III. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisites: Arch. 117 and 156. Assistant Professor Smith.

This course continues History of Architecture II and covers the Italian and French Renaissance period.

161. HISTORY OF ARCHITECTURE IV. Junior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 159. Assistant Professor Smith.

This course continues History of Architecture III and finishes the Renaissance period to modern times.

168. WORKING DRAWINGS AND SPECIFICATIONS I. Sophomore year, first semester. Drafting room, six hours. Two semester credits. Prerequisites: Ap. Mech. 158, Arch. 109 and 138. Professor Baker and Assistant Professor Smith.

This course is designed to give the student experience in the execution of working drawings as required in actual practice, together with a simultaneous study of the specifications that must accompany such drawings. Special emphasis is laid upon the uses of various building materials and their influence upon architectural design. From time to time the class visits buildings under construction as well as the offices of successful practicing architects.

169. WORKING DRAWINGS AND SPECIFICATIONS II. Sophomore year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 168. Professor Baker and Assistant Professor Smith.

In this course Working Drawings and Specifications I is continued.

172. DOMESTIC ARCHITECTURE. Senior year, first semester. Drafting room, six hours. Two semester credits. Prerequisites: Arch. 144 and 169. Professor Baker.

This is a course of drafting-room exercises covering the history and development of the modern house. Following a historical survey a study is made of the problems of location, plan, and design; types of construction, systems of sanitation, heating, and lighting. Throughout the course the student, along with the study of plans and designs and actual visits to houses, is required to solve problems.

183. CIVILIZATION AND ART I. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Hist. 123 and Arch. 156. Professor Baker.

This course comprises a survey of civilization from earliest history, laying special emphasis on the Hellenistic, Roman, and Gothic periods, and tracing the economic, political, racial, and religious phases of history simultaneously with the artistic developments of each epoch. The course consists of lectures, recitations, written papers, and research, the accomplishment of which is greatly aided by a free use of lantern slides, photographs, and library references.

185. CIVILIZATION AND ART II. Senior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Arch. 183. Professor Baker.

This continues Civilization and Art I to the close of the Renaissance.

191. OFFICE PRACTICE. Senior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Senior standing. Professor Baker.

This course is designed to acquaint the student with the relations between the architect and the contractor, the client, the building trades, the recognized architectural societies, and the community. The problems of building laws, labor laws, contracts, and bonds are also discussed. The work includes lectures, recitations, research, and reports.

Civil Engineering

Professor CONRAD
Assistant Professor FRAZIER

Instructor FURR
Instructor WHITE

The instruction in civil and highway engineering is given by means of lectures and recitations, and by the practice in the field, in the drafting room, and in the laboratory. The heaviest technical work of the department falls in the junior and senior years, during which courses are given in civil engineering drawing and in the analysis of stresses in framed structures, structural design, drainage and irrigation engineering, construction and design in masonry and concrete, railways, highway engineering, astronomy, and geodesy. Considerable time is devoted to thesis work.

The seminar affords the students an opportunity to become acquainted with modern engineering practice through discussions and references to current periodicals.

In addition to the laboratory equipment found in other engineering departments, which is available to civil engineering students as well, the Department of Civil Engineering possesses a good assortment of transits, levels, plane tables, tapes, and chains. It also owns a precise level, a direction theodolite, a repeating theodolite, and a base-line outfit. A recording gauge makes a continuous record of the stage of the Kansas river, to be used in computing the flood discharge of that stream. This information will be of great value in future years as a basis for designing works for flood protection.

COURSES IN CIVIL ENGINEERING

FOR UNDERGRADUATES

102. SURVEYING I. Freshman year, both semesters. Field work, plotting and supervised study, six hours. Two semester credits. Prerequisite: Plane Trigonometry (Math. 101). Assistant Professor Frazier, Mr. Furr, and Mr. White.

This is a brief course in the use and care of engineers' surveying instruments. Text: Breed and Hosmer's *Surveying*, Vol. I.

111. SURVEYING II. Freshman year, both semesters. Field work, plotting and supervised study, six hours. Two semester credits. Prerequisite: Surveying I. Mr. Furr and Mr. White.

The course is devoted to work in land and topographic surveying. Text: Breed and Hosmer's *Surveying*, Vol. I.

120. MASONRY AND FOUNDATIONS. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Engineering Physics I (Physics 211). Professor Conrad.

In this course a study is made of the principles underlying the design and construction of foundations, the stresses in plain masonry structures, and the method of designing such structures.

125. CIVIL ENGINEERING DRAWING I. Sophomore year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Mechanical Drawing I (Ap. Mech. 160, 165). Assistant Professor Frazier.

This course is devoted to the application of stereotomy, shades and shadows, isometric drawing, and perspective and copying working draw-

ings of engineering structures. The principles are explained to the students by such short lectures as seem necessary for the purpose. No text-book is used.

130. ELEMENTS OF IRRIGATION AND DRAINAGE RECITATION. Elective, first semester. Class work, two hours a week for the first half of the semester. One semester credit. No prerequisite. Assistant Professor Frazier.

This course comprises a brief treatment of the subjects from the agriculturist's point of view. Texts: Elliott's *Engineering for Land Drainage*, and Fortier's *Use of Water in Irrigation*.

135. ELEMENTS OF IRRIGATION AND DRAINAGE LABORATORY. Elective, first semester. Field work, six hours a week for the second half of the semester. One semester credit. No prerequisite. Assistant Professor Frazier.

Practice work in the field and drafting room is devoted to the laying out and plotting of simple farm drainage and irrigation systems. Same texts as in Civ. Engr. 130.

145. RAILWAY ENGINEERING I. Junior year, second semester. Class work, two hours. Two semester credits. Prerequisites: Surveying II and Civil Engineering Drawing I (Civ. Engr. 111, 125). Assistant Professor Frazier.

This is a short course in the theory of railway engineering based on Wellington's economic theory. Considerable time is also devoted to the study of track construction and maintenance, and to the design of yards and terminals. Texts: Raymond's *Elements of Railroad Engineering*.

151. SURVEYING III RECITATION. Sophomore year, first semester. Class work, two hours. Two semester credits. Prerequisite: Surveying II. Mr. Furr.

This course comprises a study of hydrographic, city and mine surveying. Text: Breed and Hosmer's *Surveying*, Vols. I and II.

155. SURVEYING III LABORATORY. Sophomore year, first semester. Field and drafting-room work, three hours. One semester credit. Prerequisite: Surveying II Laboratory. Mr. Furr.

The field exercises are devoted to practice work in topographic surveying. Time in the drafting room is devoted principally to topographic mapping. Texts: Same as in Civ. Engr. 151.

156. SURVEYING IV RECITATION. Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Surveying III. Mr. Furr.

This course is devoted to a study of railroad curves and earthwork.

157. SURVEYING IV LABORATORY. Sophomore year, second semester. Field and drawing room, three hours. One semester credit. Prerequisite: Surveying II. Mr. Furr.

The time is devoted to field and drafting room exercises in railroad curves and earthwork.

161. DRAINAGE AND IRRIGATION I. Junior year, second semester. Class work, two hours. Two semester credits. Hydraulics (Ap. Mech. 130) must be taken with this course or precede it. Professor Conrad.

In this course a study is made of the application of engineering principles to the design and construction of drainage and irrigation works. Considerable attention is paid to the development of ground-water supplies for irrigation. Texts: Elliott's *Engineering for Land Drainage*, and Newell and Murphy's *Principles of Irrigation Engineering*.

170. **THESIS.** Senior year, continuing through both semesters. Professor Conrad.

All candidates for the degree of bachelor of science in civil engineering are required, during their senior year, to prepare a thesis. This thesis may be a report on a proposed design, an original investigation, or a library research. Civil engineering students may, with the approval of the head of the department, take their thesis work outside of the department. The thesis subject may be selected and approved by the head of the department in which the work is done before October first next preceding the commencement at which the candidate proposes to graduate.

FOR GRADUATES AND UNDERGRADUATES

201. **BRIDGE STRESSES.** Senior year, first semester. Class work, four hours. Four semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Conrad.

This course involves a study of the algebraic and graphical methods of computing the stresses in bridges, leading up to the subject of bridge design in the following semester. Text: Merriman and Jacoby's *Roofs and Bridges*, Part I.

205. **CIVIL ENGINEERING DRAWING II.** Senior year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Civil Engineering Drawing I (Civ. Engr. 125). Professor Conrad.

This course is devoted to graphic statics and the design of simple roof trusses in timber and steel. Text: Merriman and Jacoby's *Roofs and Bridges*, Part II.

210. **ASTRONOMY AND GEODESY RECITATION.** Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Surveying III. Assistant Professor Frazier.

A brief course in the elements of practical astronomy followed by a study of the precise methods of surveying and leveling. Text: Breed and Hosmer's *Surveying*, Vol. II.

215. **ASTRONOMY AND GEODESY LABORATORY.** Senior year, first semester. Field work, three hours. One semester credit. Prerequisite: Surveying III Laboratory. Assistant Professor Frazier.

The work is devoted to simple astronomical observations, principally for determining the true meridian; to base line measurements and triangulation work. Each student is also required to run a short circuit with the precise level.

220. **WATER SUPPLY.** Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Hydraulics (Ap. Mech. 130). Professor Conrad.

The course deals with the water supply for cities from the standpoints of consumption, collection, storage, distribution, and purification.

225. **SEWERAGE.** Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Hydraulics (Ap. Mech. 130). Assistant Professor Frazier.

A study is made of the problems met in the design and construction of sewer systems and disposal plants for cities of moderate size. Text: Folwell's *Sewerage*.

230. **HIGHWAY ENGINEERING I RECITATION.** Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Mr. Furr.

A study of the principles underlying the location, construction, and maintenance of all ordinary types of roads and pavements. Text: Agg's *Construction of Roads and Pavements* (For the laboratory work in connection with this course, see Ap. Mech. 250.)

246. **BRIDGE DESIGN.** Senior year, second semester. Drawing, nine hours. Three semester credits. Prerequisite: Bridge Stresses (Civ. Engr. 201). Professor Conrad.

This course comprises general drawings for a highway truss bridge, a railroad truss bridge, and a railroad deck plate girder. Text: Merriam and Jacoby's *Roofs and Bridges*, Part III.

250. **CONCRETE DESIGN RECITATION.** Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Conrad.

An application of the principles of reinforced concrete to the design of chimneys, buildings, retaining walls, dams, and bridges. Text: Taylor and Thompson's *Concrete, Plain and Reinforced*.

255. **CONCRETE DESIGN LABORATORY.** Senior year, second semester. Drafting-room work, three hours. One semester credit. Prerequisite: Applied Mechanics II (Ap. Mech. 110.). Professor Conrad.

In this course the students make drawings of reinforced concrete retaining walls, dams, slab and girder bridges, and arch bridges. Text: Taylor and Thompson's *Concrete, Plain and Reinforced*.

260. **RAILWAY ENGINEERING II RECITATION.** Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Railway Engineering I (Civ. Engr. 145). Assistant Professor Frazier.

This course comprises the study of railway operation and maintenance.

265. **RAILWAY ENGINEERING II LABORATORY.** Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Prerequisite: Railway Engineering I (Civ. Engr. 145). Assistant Professor Frazier.

In the field, reconnoissance and survey of a short railroad is made, and the office work consists in making the maps, profiles, and estimates from the survey. Text: Allen's *Railroad Curves and Earthwork*.

270. **HIGHWAY ENGINEERING II RECITATION.** Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Highway Engineering I (Civ. Engr. 230). Mr. Furr.

This course consists in a study of highway laws, highway administration in the various states, and highway economics.

275. **HIGHWAY ENGINEERING II LABORATORY.** Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Prerequisite: Highway Engineering I (Civ. Engr. 230). Mr. Furr.

In the field, a reconnoissance and survey for a highway a few miles long is made. The work in the drafting room consists in making the maps, profiles, and estimates from the survey.

280. **DRAINAGE AND IRRIGATION II RECITATION.** Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Drainage and Irrigation I. Professor Conrad.

A continuation of the former course in Drainage and Irrigation, dealing with the design of irrigation structures and the management of irrigation projects.

285. **DRAINAGE AND IRRIGATION II LABORATORY.** Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Professor Conrad.

The field work consists in making the survey for a drainage or irrigation project. In the office the maps, estimates, and designs are made, using the survey as a basis.

Electrical Engineering

Professor REID
Assistant Professor KLOEFFLER

Assistant Professor FENTON
Instructor MARKLE

Instruction in this department is given by means of textbooks, lectures, reference work, and laboratory periods. The class work is illustrated by means of demonstration apparatus and the projection lantern.

The electrical measurement and calibration laboratory is provided with standard instruments of measurement, including standards of resistance, and electromotive force, self-induction, and capacity, Wheatstone bridges, and potentiometers. More than 100 ammeters, voltmeters, and wattmeters, with 250 ranges, of the best types of American and foreign manufacture, are available for use. The instrument equipment includes also frequency meters, a synchroscope, a power factor meter, electric, magnetic, centrifugal and liquid tachometers, slip meters, a Tirrill voltage regulator, current and potential transformers, electrostatic voltmeters, and rotating standard test meters.

The modern equipment contained in the telephone laboratory has been made possible through the liberal coöperation of various telephone companies. It includes a Western Electric demonstration panel, containing all parts and circuits for connecting two subscribers through the A board and B board of the multi-office exchange; a Swedish-American magneto wall switchboard; a demonstration outfit of the Automatic Telephone Company type, including line switches, first and second selectors and connector switches; Kellogg Switchboard & Supply Company's switchboard panel, and two demonstrating panels of the Stromberg-Carlson type, one containing all the parts and circuits for the magneto switchboard and the other the same for common battery board. A complete line of bridging magneto and common battery wall telephone sets of all above-mentioned makes, including two of Leigh Cracraft type, are to be found in the laboratory. In addition there are series telephone sets, desk telephones, various individual telephone parts and potentiometer boards, for making transmission efficiency tests.

The machine, instrument, and general apparatus equipment of the department is unusually complete. More than forty generators and motors, both alternating and direct current, from one kilowatt to thirty kilowatts in size, and totaling 350 horsepower, are available for the use of students receiving instruction in the electrical laboratories. In addition, there are eight machines ranging from five to thirty-five kilowatts, complete except windings, available for instruction in armature and field winding.

The above machine equipment includes a 30-kilowatt, 2,300-volt, polyphase alternating-current generator, a 15-kilowatt, 125-volt, alternating-current generator, which may be connected as a single-phase, two-phase, three-phase, six-phase, or twelve-phase machine; a 7½-kilowatt synchronous converter, which may be used as a one-, two-, three-, or quarter-phase motor; a 10-kilowatt special synchronous converter, designed for use in single-, three-, or six-phase operation, equipped with amortisseur wind-

ing, speed limiting and oscillating devices, series winding and commutating poles. Three 5-kilowatt transformers are accessories of this machine. A pair of 6-kilowatt compound-wound generators is used as a balancer set on the Edison 3-wire system, supplying the laboratory with 110 volts, from the 220-volt power supply, and to illustrate commercial use of such systems. Two compound-wound generators on the same sub-base, direct-connected to a motor, are used to illustrate commercial use of generators in parallel operation, Edison 3-wire system, and "pump-back" factory efficiency tests.

A set of four machines, mounted on a common bed-plate, includes two 7½-kilowatt alternating-current generators, and two 15-horsepower direct-current motors, whose speed is variable from 600 to 1,800 revolutions. By means of flanged couplings, any combination of two, three, or four machines may be operated. The generator armature windings are brought out to twelve terminals, and each may be connected as a single-, two-, or three-phase Y or delta, six-phase or twelve-phase machine, and when running in synchronism, the armatures of the two machines may be turned with reference to each other through 180 degrees, so that any desired phase difference may be obtained. These alternators may be used in parallel, as synchronous motors, in meter testing to produce an artificial power factor, and many other combinations.

Accessory apparatus includes field and starting rheostats and controllers, load racks, and banks of lamps, inductive and capacity loads, 20,000- and 60,000-volt testing transformers, arc and spot welding equipment, a 3-element oscillograph with photographing attachments, with which simultaneous waves of three electric currents or voltages may be observed and photographed, a mercury arc rectifier, and a constant current transformer.

Through the generous assistance of the Westinghouse Electric and Manufacturing Company, the department has been able to install a very complete electric railway test set, consisting of two street-railway motors of a most recent design and a complete control equipment of the H L type. The motors are mounted on and geared to a shaft, on which are a flywheel and brake pulley. The flywheel requires as much energy to accelerate as does a 10-ton car, and the brake load may be adjusted to reproduce any desired load on car and condition of track. The H L control equipment includes the master controller, and electrically controlled, air-operated unit switches. It is the type used on many single cars and multiple-car trains on surface, elevated and subway roads, and also in many of the modern steam road electrifications.

COURSES IN ELECTRICAL ENGINEERING

FOR UNDERGRADUATES

101. DIRECT-CURRENT MACHINES I RECITATION. Junior year, first semester. Recitations or lectures, three hours. Three semester credits. Prerequisites: Calculus I (Math. 113) and Engineering Physics II (Physics 212). Professor Reid.

The work consists of a detailed study of the fundamental principles of magnetic and electric circuits and their application to the various types of direct-current machines. Numerous problems involving the application of the principles are given as a part of the course. The

class work is planned to coördinate with the work in the electrical engineering laboratory. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. I.

105. DIRECT-CURRENT MACHINES I LABORATORY. Junior year, first semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Direct-Current Machines I Recitation. Assistant Professor Kloeffer.

A series of experiments is outlined which is designed to necessitate careful, accurate measurement. The student is obliged to make all electrical connections with the necessary instruments in the circuit, and to record the required data. From the laboratory records a written report upon each experiment or test must be submitted. The laboratory exercises include tests for armature and field resistance, potential curves, machine characteristics, motor and generator efficiencies. Text: Swenson and Frankenfield's *Testing of Electromagnetic Machinery*, Vol. I.

110. DIRECT-CURRENT MACHINES II RECITATION. Junior year, second semester. Lectures or recitations, three hours. Three semester credits. Prerequisite: Direct-Current Machines I. Assistant Professor Kloeffer.

This course is a continuation of Direct-Current Machines I. It involves a detailed study of the various types of direct-current machinery with respect to theory and operation. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. I.

The latter part of the course is devoted to a study of the construction and testing of the various types of voltmeters, ammeters, wattmeters, and watthour meters. Text: Jansky's *Electrical Meters*.

115. DIRECT-CURRENT MACHINES II LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Direct-Current Machines II Recitation. Assistant Professor Kloeffer.

Special attention is given in this course to the different methods of determining generator and motor efficiencies and to the proper tabulation and interpretation of results. The latter part of the course is devoted to the calibration of electrical instruments. Text: Swenson and Frankenfield's *Testing of Electromagnetic Machinery*, Vol. 1.

121. ELECTRICAL MEASUREMENTS RECITATION. Junior year, first semester. Lectures and recitations, one hour. One semester credit. Prerequisites: Calculus I (Math. 113) and Engineering Physics II (Physics 212). Assistant Professor Kloeffer.

This course is an extension of the work in electricity in Engineering Physics II. It treats of the various methods for the measurement of resistance, current, electromotive force, capacity, and inductance. Text: A. W. Smith's *Principles of Electrical Measurements*.

126. ELECTRICAL MEASUREMENTS LABORATORY. Junior year, first semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Electrical Measurements Recitation. Assistant Professor Kloeffer.

The laboratory course follows the work of the classroom by giving applications of the fundamental principles studied.

130. ELECTRICAL ENGINEERING M-I RECITATION. Senior year, first semester. Lectures or recitations, three hours. Three semester credits. Prerequisites: Engineering Physics II (Physics 212) and Calculus I (Math. 113). Assistant Professor Kloeffer.

This course covers the subject of direct-current machines with reference to the fundamental laws of the electric circuit, the principles of direct-current machinery, and the more important commercial tests. Text: Bailey's *Dynamo-Electric Machinery*.

135. ELECTRICAL ENGINEERING M-I LABORATORY. Senior year, first semester. Laboratory, three hours. One semester credit. This course should accompany or follow Electrical Engineering M-I Recitation. Assistant Professor Fenton.

Practice is given in the proper use of electrical measuring instruments. The experiments include a variety of tests requiring accurate observation, and a knowledge of the theory of dynamo machines. The various standard characteristics and efficiency tests are given. A written report on each test is required.

140. ELECTRICAL ENGINEERING M-II RECITATION. Senior year, second semester. Lectures and recitations, three hours. Three semester credits. Prerequisite: Electrical Engineering M-I. Professor Reid.

The work covers briefly the important principles of alternating-current phenomena. The leading types of alternating-current machinery and apparatus are discussed with reference to their operation and their adaptability to different classes of service. Text: Bailey's *Dynamo-Electric Machinery*.

145. ELECTRICAL ENGINEERING M-II LABORATORY. Senior year, second semester. Laboratory work, three hours. One semester credit. Assistant Professor Fenton.

This course includes practice in the use of alternating-current instruments; standard tests of alternators, motors, and transformers; and methods of operating the different types of alternating-current machinery.

150. ELECTRICAL MACHINE DESIGN I. Senior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Direct-Current Machines II. Assistant Professor Kloeffler.

The purpose of the course is to acquaint the student with the principles of commercial design of direct-current machinery. Each student is required to make the necessary calculations and drawings for a direct-current generator. Text: Gray's *Electrical Machine Design*.

155. ELECTRICAL MACHINE DESIGN II. Senior year, second semester. Laboratory, six hours. Two semester credits. Prerequisites: Alternating-Current Machines II and Electrical Machine Design I. Assistant Professor Kloeffler.

This course embraces the elementary principles underlying the design of alternating-current apparatus. Students are required to make calculations and drawings for an alternating-current machine. Text: Gray's *Electrical Machine Design*.

160. ELECTRICAL ENGINEERING C RECITATION. Senior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisite: College Physics. Assistant Professor Fenton.

This work is designed to cover briefly the fundamental principles of direct-current and alternating-current electricity. Emphasis is laid upon the proper installation and operation of the different classes of machines and the use of electricity for lighting and power. Text: Morecroft's *Continuous and Alternating Machines*.

165. ELECTRICAL ENGINEERING C LABORATORY. Senior year, second semester. Laboratory work, three hours. One semester credit. Assistant Professor Fenton.

The laboratory practice is designed to give the student a knowledge of the most important commercial tests. The proper use of electrical instruments is emphasized. A written report of each laboratory test is required.

170. ELECTRICAL MACHINERY AND CONSTRUCTION. Freshman year, first and second semesters. Laboratory work, six hours. Two semester

credits. Professor Reid, Assistant Professor Fenton, and Mr. Markle.

This is an introductory course in applied electricity. About one-half the time is devoted to acquainting the student with the various modern methods of interior wiring, approved by the National Board of Fire Underwriters, including open, cleat wiring, knob and tube-concealed wiring, flexible and rigid iron-pipe conduit, and metal molding. The wiring "code" is used as a reference in this part of the course, and on its completion the student should be competent to plan, lay out and install the wiring for the usual residence or business building.

The remainder of the time is devoted to the installation, care, operation and repair of electrical machinery. It includes armature winding of direct- and alternating-current motors and generators; the diagnosis and location of faults—short circuits, open circuits, grounds—and the repair of these various types of electrical-machine troubles. It also includes the installation and connection of motors, generators, meters, compensators, and other of the usual types of electrical apparatus.

195. THESIS. Senior year, continuing through both semesters. Professor Reid, Assistant Professor Kloeffer, Assistant Professor Fenton, and Mr. Markle.

The subject for thesis work is selected in consultation with the head of the department, at the beginning of the first semester of the senior year. The work is continued during the second semester. Every opportunity is given the student to work out original ideas as to design and operation of electrical apparatus and machinery.

FOR GRADUATES AND UNDERGRADUATES

201. ALTERNATING-CURRENT MACHINES I RECITATION. Junior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisites: Calculus II (Math. 116) and Direct-Current Machines I. Professor Reid.

The work consists of a mathematical treatment of alternating-current phenomena. A study is made of the vector method of treating alternating-current problems. The solution of problems involving single and polyphase circuits forms an important part of the course. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. II.

205. ALTERNATING-CURRENT MACHINES I LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Alternating-Current Machines I Recitation. Professor Reid and Assistant Professor Kloeffer.

It is the aim of this course to provide a series of experiments illustrating the theoretical work of the lecture room. Practice is given in the accurate measurement of capacity and inductance, and the effect of each upon the circuit. The latter part of the course is devoted to a study of polyphase circuits.

210. ALTERNATING-CURRENT MACHINES II RECITATION. Senior year, first semester. Recitations or lectures, four hours. Four semester credits. Prerequisite: Alternating-Current Machines I. Professor Reid.

This is a continuation of Alternating-Current Machines I. The course consists of a study of the theory of alternating-current machinery, alternators, synchronous motors, induction motors, transformers, and the various devices used in connection with alternating-current work. A study is also made of the application of the different types of machinery to industrial uses. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. II.

215. ALTERNATING-CURRENT MACHINES II LABORATORY. Senior year, first semester. Laboratory work, six hours. Two semester credits. This course should accompany or follow Alternating-Current Machines II Recitation. Professor Reid.

A series of experiments involving special and commercial tests of alternators, synchronous motors, transformers, and the different types of alternating-current machinery and apparatus.

220. TELEPHONY RECITATION. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisites: Direct-Current Machines I and Alternating-Current Machines II. Assistant Professor Kloeffler.

This course consists of a consideration of the principles of acoustics and alternating-current phenomena involved in telephone practice. A detailed investigation is made of telephone apparatus and circuits, with reference to their adaptation to various kinds of telephone service. This is followed by a study both of the design and maintenance of telephone lines and central-office apparatus, and of central-office methods, the selection of apparatus, and methods of handling telephone traffic. Text: McMeen and Miller's *Telephony*.

225. TELEPHONY LABORATORY. Senior year, first semester. Laboratory, three hours. One semester credit. This course should accompany or follow Telephony Recitation. Assistant Professor Kloeffler.

This course includes the study and measurement of telephone parts, the actual wiring of telephone circuits on the magneto, common battery and automatic systems, location of line trouble, and transmission efficiency tests on various types of apparatus and circuits.

235, 236. ILLUMINATING ENGINEERING. Senior year, second semester. Lectures and recitation, two hours; laboratory, three hours. Three semester credits. Prerequisites: Calculus II (Math. 116) and Engineering Physics II (Physics 212). Assistant Professor Kloeffler.

This course is devoted to a study of photometry and light standards and the principles of illumination. The different types of incandescent and arc lamps are discussed with reference to their efficiency and adaptability to different classes of lighting. Systems of street illumination are also studied. Text: Croft's *Practical Electric Illumination*

240. ELECTRIC RAILWAYS. Senior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisite: Alternating-Current Machines II. Professor Reid.

A study is made of the development of electric traction; traffic conditions and train schedules; speed-time curves; power generation and distribution for electric railways signal systems; types of cars and locomotives in use; various control systems; and adaptability of electric traction to steam road. Text: Harding's *Electric Railway Engineering*.

Farm Engineering

Professor _____
Assistant Professor SANDERS

Instructor PARSONS
Assistant SMITH

This department gives instruction in such branches of engineering as are directly related to agriculture. It also correlates and gives general supervision to such courses presented in other engineering departments as are open to students in agriculture and agricultural engineering, in order that the agricultural application and uses of engineering principles, methods, and materials may be kept clearly before the student.

In all the courses given, the time is carefully apportioned between the classroom and the laboratory, in order to present the subject in the clearest and most forceful way. The practical application of theoretical principles is emphasized.

The various courses in rural architecture, farm machinery, and tractors are under the direct supervision of this department. The student is taught the requirements of farm buildings, is trained to plan their arrangement and to select and use the proper construction materials in the most advantageous way. The farm machinery laboratory equipment is unusually ample and complete; all kinds of the most modern implements, to the value of nearly \$10,000, are available, whereby their construction, adjustment, operation, and care may be fully covered, not only in laboratory study, but in field work and draft tests as well. The study of traction engines is arranged to cover thoroughly the construction, operation and repair of the numerous modern tractors which are part of the regular equipment; traction tests in conjunction with various types of farm power machinery are also made. The tractor laboratory is also equipped with four tractor power units mounted on bases, with various types of tractor ignition apparatus, and with complete apparatus for power and draft tests. All farm machinery and tractor equipment is kept up to date through a system of exchange with the manufacturers whereby old machines are replaced, when advisable, by new ones.

The comparatively recent development of this work, and its rapidly growing importance, renders investigational study very valuable, and special attention is given to the courses covering this phase of the subject.

COURSES IN FARM ENGINEERING

FOR UNDERGRADUATES

102. RURAL ARCHITECTURE. Elective, both semesters. Lectures, recitations, drafting-room practice, nine hours. Three semester credits. Professor ———.

This course includes lectures on the requirements, details of arrangement, and materials of construction for barns, storage, and work buildings for the farm. The preparation of specifications, bills of material, and estimates of costs is an essential part of the course. In the drafting-room, plans are prepared for typical farm buildings.

106. FIELD MACHINERY RECITATION. Sophomore year and elective, both semesters. Class work, one hour. One semester credit. Mr. Parsons.

The fundamentally important definitions and principles relating to farm machinery are first given, this being followed by material concerning the development, construction, operation, and use of soil preparation, seeding, cultivating, harvesting, and miscellaneous machinery. The importance of proper selection and care of farm machinery is emphasized.

107. FIELD MACHINERY LABORATORY. Sophomore year and elective, both semesters. Laboratory, three hours. One semester credit. Mr. Parsons.

A detailed study of the machines taken up in the classroom is conducted both in the laboratory and in the field.

111. POWER MACHINERY RECITATION. Junior year and elective, second semester. Class work, one hour. One semester credit. Prerequisite: Field Machinery. Mr. Parsons.

This course continues the study of field machinery with special reference to those machines requiring mechanical power for their operation, including engine plows, hay balers, feed mills, corn shellers, ensilage cutters, and threshing machines.

112. POWER MACHINERY LABORATORY. Junior year and elective, second semester. Laboratory, three hours. One semester credit. Mr. Parsons.

Laboratory and field instruction is given and tests are conducted upon the machines discussed in the classroom.

116. TRACTORS AND TRUCKS RECITATION. Junior year, both semesters. Lectures and recitations, two hours. Two semester credits. Prerequisite: None. Assistant Professor Sanders.

This course covers the study of the construction and operation of tractors and trucks, with special reference to machines using internal combustion engines as power units.

117. TRACTORS AND TRUCKS LABORATORY. Junior year, both semesters. Laboratory, three hours. One semester credit. Assistant Professor Sanders and assistants.

A study is made of the construction of steam and gas tractors and trucks and practice is given in the operation and testing of these machines under belt, road, and field conditions.

119. FARM SANITATION AND WATER SUPPLY. Elective, second semester. Class work, two hours. Two semester credits. No prerequisite. Professor ———.

A study of sources of water supply, installation of cisterns on the farm, and farm sanitation. No text is used, the instruction being given by lectures, bulletins, and library references.

120. FARM EQUIPMENT RECITATION. Elective, both semesters. Lectures and recitations, one hour. One semester credit. Professor ———.

A study of handy farm practices and important items of equipment for the farmstead is made in this course.

121. FARM EQUIPMENT LABORATORY. Elective, both semesters. Laboratory, three hours. One semester credit. Professor ———.

Practice is given in rope work, including knots, splices and halters; belt lacing and splicing; soldering; pipe fitting; and repairing of farm machinery.

125. FARM MOTORS RECITATION. Junior year, both semesters and summer school. Lectures and recitations, two hours. Two semester credits. Assistant Professor Sanders.

A descriptive study of steam engines, boilers, internal-combustion engines and automobiles, with special reference to their utilization on the farm.

126. FARM MOTORS LABORATORY. Junior year, both semesters and summer school. Laboratory, three hours. One semester credit. Assistant Professor Sanders and assistants.

130. ADVANCED FARM MACHINERY. Senior year and elective, both semesters. Laboratory, six hours. Two semester credits. Prerequisites: Field Machinery and Power Machinery. Professor ———.

Draft tests are made on various types of farm machines. A study is made also of the cost of operating these machines.

135. ADVANCED TRACTORS AND TRUCKS. Elective, both semesters. Laboratory, six hours. Two semester credits. Prerequisite: Tractors and Trucks. Professor ——— and Assistant Professor Sanders.

Draft, power, and fuel economy tests are made upon standard types of tractors and trucks.

175. THESIS. Senior year, continuing through both semesters. Assistant Professor Sanders and Mr. Parsons.

Original problems relating to subjects taught in this department are assigned for investigation, after consultation with the head of the department, at the beginning of the first semester of the senior year.

FOR GRADUATES AND UNDERGRADUATES

205. **FARM MACHINERY RESEARCH.** Elective, both semesters. Six to fifteen hours laboratory or reading. Two to five semester credits. Assignment by permission. Prerequisites: Field Machinery and Power Machinery and such other preparation as may be necessary to conduct properly the investigation assigned. Professor ——— and Mr. Parsons.

Farm Machinery offers a broad field for original investigation along the lines of draft requirements, power consumption and cost of operating. Students admitted to this course are assigned to one project.

215. **TRACTOR RESEARCH.** Elective, both semesters. Six to fifteen hours laboratory, computation, or reading. Two to five semester credits. Prerequisites: Tractors and Trucks and such other preparation as may be necessary to conduct properly the problem assigned. Professor ——— and Assistant Professor Sanders.

Intensive studies are made of problems relating to tractor operation and construction.

General Engineering

Dean POTTER

101. **ENGINEERING LECTURES.** Freshman year, continuing through both semesters. Lectures, one hour a week. Dean Potter, other members of the engineering faculty, and visiting practicing engineers.

These lectures are designed to acquaint students who are beginning the study of engineering and architecture with the fundamental principles of their profession and to give them a general survey of the field of engineering.

105. **SEMINAR.** Sophomore, junior, and senior years. Required throughout each year. Lectures, papers, and discussions, one hour a week. Members of the engineering faculty.

This work differs for the various curricula, and as far as possible is conducted by the student branches of the professional engineering societies. In the case of electrical engineering students the work is conducted by the student branch of the American Institute of Electrical Engineers; the student branch of the American Society of Mechanical Engineers has charge of the work for students in mechanical engineering; the Kansas State Agricultural College Civil Engineering Society and the Architects' Club conduct the seminars for students in civil engineering and architecture, respectively. Students are required to present abstracts and reviews of articles appearing in the journals of their respective societies or in the technical press of their profession or to prepare original articles. Occasionally these individual groups unite in the general Engineering Society, under whose auspices lectures are given by practicing engineers and by members of the engineering and College Faculty on topics of general interest to engineering students.

Shop Practice

Professor CARLSON
Instructor HOUSE
Instructor LYNCH
Instructor JONES
Instructor GRANT
Instructor SELLERS

Instructor BUNDY
Instructor AIMAN
Assistant GRANELL
Assistant _____
Assistant _____

The work in the shops is planned to meet the needs of three classes of students: (1) those in the special courses related to engineering and agriculture who expect to make use of the knowledge gained in their subsequent work in the shops and on the farm; (2) those who are training themselves for teaching and need to secure a general knowledge of the principles underlying shop work, and sufficient skill in the performance of various operations, to be able to instruct others; and (3) those in the courses in engineering whose need is to secure a thorough knowledge of the methods of performing various kinds of shop work; of the machines best suited for the different purposes; of the amount of work that may be expected of the different machines and of the workmen under different conditions.

The equipment of the shops is set forth to a certain extent below:

WOOD SHOP. This room is 40 by 90 feet; it contains 252 separate sets of tools, and benches for forty-eight students in each class. In this room are also installed an automatic band-saw filer and setter, and two grindstones driven by an individual motor.

PATTERN SHOP. This room is 45 by 81 feet and contains sixteen K. S. A. C. 12-in. by 32-in. safety wood-turning lathes; one 12-in. motor head-stock lathe; one 18-inch pattern-maker's lathe, with tools and chucks; eight pattern-makers' benches complete, with necessary small tools, core-box planes, electric glue-heating fixture, and other tools and apparatus for pattern work.

WOODWORKING MACHINERY ROOM. This room is 35 by 42 feet, and contains one 24-inch wood planer, one friezer, one 34-inch band saw, one jig saw, one 20-inch variety saw, one power mortiser, one sandpapering machine, one 8-inch jointer, one foot mortiser; a stock and tool room for holding the material, and small tools and gauges used in the wood shop.

MACHINE SHOP. This room is 40 by 170 feet, and contains thirteen engine lathes, as follows: One 14-inch Hendley-Norton lathe; two 14-inch Flather lathes; one 13-inch Lodge & Davis lathe; one 16-inch Lodge & Shipley combination engine and turret lathe; two 14-inch Reed lathes; five 14-inch K. S. A. C. lathes; one 28-in. by 20-ft. American lathe, equipped with blocks to raise it to 60-inch swing; one K. S. A. C. speed lathe; one Brown & Sharp No. 3-A Universal Milling Machine; one Brown & Sharp No. 2 universal milling machine; one No. 2 Brown & Sharpe universal grinder; one K. S. A. C. (Hendley-Norton pattern) shaper; one K. S. A. C. (Pratt & Whitney pattern) shaper; one Gray 26-in. by 6-ft. planer; one Niles 51-inch vertical turning and boring mill; one Baker Bros. Key seater; one Barnes 34-inch self-feed drill press; one Rogers 12-inch sensitive drill press; two K. S. A. C. 12-inch sensitive

drill presses; one K. S. A. C. (Bemis-Miles pattern) 20-inch double-traverse quick-return shaper; two Morse & Dexter valve reseating machines; one Walker universal grinder; one K. S. A. C. special drill grinder; one bolt and pipe machine, taking pipe up to two inches; one power hack saw; one Emerson direct-connected motor polishing machine; a complete set of sheet-metal worker's tools; benches and tools for fifty students, and a tool room completely stocked with the necessary tools. A time clock (calculagraph) is installed near the machine shop office for recording the attendance of the students and workmen.

Adjacent to the machine shop is a room 18 by 20 feet, which is used as a stock and storage room for the rough and finished parts of the 1½-hp. gas engine and 12-in. by 32-in. wood-turning lathes, which are constantly in the process of construction as problem work for the students.

BLACKSMITH SHOP. This room is 50 by 100 feet and is equipped with twelve K. S. A. C. downdraft forges and thirty-three Sturtevant downdraft forges for students' use, and two large special Sturtevant forges for general use. Each forge has an anvil and a complete set of forging tools, and is supplied with forced draft and power exhaust. In addition to the general tools for a fully equipped blacksmith shop there is also installed a 12-inch K. S. A. C. sensitive drill press, punch, and shear, K. S. A. C. (Erie pattern) 400-pound steam hammer, emery grinder, tire bender, tire shrinker, two Oxweld oxyacetylene welding outfits, and a number of pieces of special apparatus built by the department.

IRON FOUNDRY. This room is 27 by 100 feet. It is equipped with a 1½-ton Colliau Cupola; 4-ton, 25-foot-span K. S. A. C. traveling crane; core oven, 5 by 6 by 7 feet (arranged so it can be heated with either coke or gas); one car, track and turntable; one 2-ft. by 3-ft. K. S. A. C. rumbler; one K. S. A. C. emery grinder; one K. S. A. C. molding machine; one Arcade squeezer-type molding machine; one air-driven sand riddler; one hammer core machine; an exceptionally large number of flasks, both wood and iron; ladles and necessary small tools.

BRASS FOUNDRY. This room is 24 by 34 feet. It is equipped with one 21-in. by 36-in. brass furnace, one 11-in. by 20-in. brass furnace, crucibles, flasks, molding tubes, benches, cases, racks and necessary tools for bench and floor molding.

AMPHITHEATER. This room is 24 by 54 feet. It is adjacent to the blacksmith shop and iron and brass foundries, and is equipped with forge, anvil, forge tools, bench, molding trough and molding tools, blackboard, etc., for lectures and demonstration work.

LOCKER. This room is 36 by 40 feet. It is conveniently located and is equipped with 244 special metal lockers for the use of students taking work in the machine shop, blacksmith shop, foundry and engineering laboratory. A portion of this is made a separate locker room and bathroom for the use of the shop foreman, and contains seven metal lockers.

COURSES IN SHOP PRACTICE**FOR UNDERGRADUATES**

101. **WOODWORK.** Freshman year, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Parker and Mr. Aiman.

This is a course for engineering students, the first part of which consists of exercises to give familiarity with hand and bench tools. The latter part of the course is devoted to such work as will acquaint the student with the methods of operating the various woodworking machines used in commercial woodworking.

105. **WOODWORK I.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Parker and Mr. Aiman.

This beginning course is designed to give practice with the woodworking bench tools on the various common woods, and to teach the proper methods of finishing woods with stains, varnish, paint, etc. Considerable emphasis is placed upon the proper use and care of tools.

110. **WOODWORK II.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Woodwork I (Shop 105). Mr. Parker and Mr. Aiman.

This is a continuation of Woodwork I, with practice in the use of the rabbet, router, and matching planes, and with the plow dado and fillister on such work as will give the necessary practice. Considerable emphasis is laid upon the proper use and care of the tools and on the use of wood finishes.

115. **WOODWORK III.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Woodwork II (Shop 110). Mr. Parker and Mr. Aiman.

In this course in mill work, practice is given on such articles as bring into use all of the woodworking machinery.

120. **WOODWORKING FOR GRAMMAR GRADES** Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: None. Mr. Parker and Mr. Aiman.

This course is designed for those who are preparing to teach manual training. It takes up the beginning work, and the exercises given are such as would be suitable for the grammar grades.

125. **WOODWORKING I FOR HIGH SCHOOLS.** Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodworking for Grammar Grades (Shop 120.) Mr. Parker and Mr. Aiman.

In this continuation of Woodworking for Grammar Grades, problems suitable for students in the high schools are given. Special attention is given to the study of woods and methods of finishing them, as well as to the use and care of tools.

130. **WOODWORKING II FOR HIGH SCHOOLS.** Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodworking I for High Schools (Shop 125). Mr. Parker and Mr. Aiman.

This is a continuation of Woodworking I for High Schools, with advanced work in cabinet construction by the use of woodworking machinery, and such bench work as necessary. Special emphasis is placed upon the quantity as well as the quality of the work, in order that a proper use may be made of time. Assignments are given which cover woodworking machinery, tools, and sharpening, and the drawing up of sketches for a completely equipped woodworking shop.

135. **WOODTURNING.** Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodworking II for High Schools (Shop 130). Mr. Parker.

This work is such as will give the student a thorough training in handling a lathe and turning tools. Those taking this work are expected to arrange their assignments so that a portion of the time can be devoted to assisting with the teaching of the more elementary classes in the wood shop. This training will be found valuable to those who have had no teaching experience.

140. **ADVANCED WOODWORK.** Elective, first semester. Laboratory, six hours, supplemented by lectures. Two semester credits. Prerequisite: Woodwork (Shop 101). Mr. Parker and Mr. Aiman.

Bench and machine work in making some of the most common building details, such as porch newels and rails, and plain and fancy molding cornices, is given. The lecture work consists of a detailed study of the wood finishes, tools, and machines used in building construction.

141. **FARM SHOP PRACTICE.** Elective, both semesters and summer school. Laboratory, nine hours. Three semester credits. Mr. Jones and Mr. Lynch.

This course is designed for those who wish to prepare themselves for teaching in accordance with the Smith-Hughes act. The course consists of blacksmithing closely related to farm work, babbitting, soldering, belt lacing, thread cutting with band dies and taps, drilling, and drill grinding.

145. **PATTERN MAKING.** Junior and senior years, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Foundry Practice (Shop 160). Mr. Parker and Mr. Aiman.

A series of exercises is given embodying the principles governing the construction of plain and split patterns, including core prints and core boxes, after which practical patterns are made of machine parts.

146. **FARM WOODWORK.** Elective, both semesters and summer school. Laboratory, nine hours. Three semester credits. Mr. Parker and Mr. Aiman.

This practical course is designed for the training of teachers to handle problems in connection with carpenter work on the farm. It consists of rafter cutting and erection, studding and siding work, making window and door frames, hanging doors, and similar building operations on full-size construction work. Bills of material will be made in all cases before each exercise is started. Exercises are given in saw filing, tool sharpening, and the general care and upkeep of tools.

150. **FORGING I.** Freshman year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Lynch and Mr. Granell.

This course in the forging of iron and steel is designed to teach the principles and operations of drawing, bending, upsetting, welding, twisting, splitting, and punching, and the proper methods of making forgings and tools. Tools required: a two-foot rule and a pair of five-inch outside calipers, a center punch, and ball pein hammer weighing with handle about two pounds.

155. **FORGING II.** Sophomore year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite: Forging I (Shop 150). Mr. Lynch and Mr. Granell.

Advanced work in the forging of iron and in the manufacture of steel tools is given, including instruction in hardening, tempering, casehardening, and annealing, heat treating, and testing of tool steels. Tools required: Same as in Forging I.

160. **FOUNDRY PRACTICE** Sophomore year, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Grant. Practice is given in floor, bench, and machine molding, in core making, and in casting in iron, copper, brass, and special alloys. A study is also made of modern foundry construction, equipment, materials, and methods.

165. **METALLURGY.** Sophomore year, both semesters. Lectures and recitations, two hours. Two semester credits. Professor Carlson and Mr. Sellers.

This course deals with the manufacture and use of iron, steel, copper, and their alloys, as well as their proper selection and use in the manufacturing industries.

170. **MACHINE TOOL WORK I.** Junior year, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Foundry Practice (Shop 160). Mr. Sellers, Mr. Jones, and Mr. Bundy.

Practice is given in chipping, filing, shaper and planer work, scraping, drilling, and turning on the lathe. Tools required: A four-inch scale, or B. & S. slide caliper, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, and one B. & S. center gauge.

180. **ADVANCED PATTERN MAKING.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Pattern Making (Shop 145). Professor Carlson and Mr. Parker.

This is a continuation of Pattern Making, with more advanced work, including match-board work, patterns for molding machines, and general pattern work.

183. **ADVANCED FOUNDRY PRACTICE.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Foundry Practice (Shop 160). Professor Carlson and Mr. Grant.

This is a continuation of Foundry Practice, including green and dry sand and loam molding. A study is also made of the different mixtures of iron, of handling the cupola and brass furnace, of difficult molding and core work, and of making steel castings.

186. **FORGING III.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Forging II (Shop 155). Mr. Lynch and Mr. Granell.

More advanced work is given in the working of iron and steel and in studying the effect of the different heat treatments upon steel. Opportunity will be given for work with the oxyacetylene and thermit processes of welding.

189. **FORGING IV.** Elective both semesters. Laboratory, three hours. One semester credit. Prerequisite: Forging III (Shop 215). Professor Carlson and Mr. Lynch.

Opportunity is offered for work in steel and iron, oxyacetylene welding, steam hammer work, drop forge work, and other lines, depending upon the object in view and the previous training of the student.

192. **MACHINE TOOL WORK II.** Junior year, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Machine Tool Work I (Shop 170). Mr. Sellers, Mr. Jones, and Mr. Bundy.

Progressive problems are given in turning and calipering, in boring, in reaming and taper turning and in threading on the lathe with exercises in chucking, the use of forming tools, and gear cutting. A study is made of cutting edges and tool adjustments best suited to the different metals, and of cutting speeds and feeds. Tools required: same as for Machine Tool Work I.

193. **MACHINE TOOL WORK III.** Senior year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite:

site: Machine Tool Work II (Shop 225). Mr. Sellers, Mr. Jones, and Mr. Bundy.

This course takes up work on the turret lathe, boring mill and grinder. Practical work is also given with the jigs and templets, and a study is made of the rapid production of duplicate parts, of belts, lacings, and other methods of belt connection, and of compound and differential indexing.

195. **THESIS.** Senior year, continuing through both semesters. Professor Carlson.

A thesis gives an opportunity for the student to work out problems of interest and value to himself under his own initiative, but subject to the supervision of the instructors. The shops have ample facilities for carrying on work of this character, of a constructive or investigative nature, and every possible aid is given those who select theses along this line.

FOR GRADUATES AND UNDERGRADUATES

235. **MACHINE TOOL WORK IV.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Machine Tool Work III (Shop 230). Mr. Sellers and Mr. Jones.

The time of this course is devoted to the shop phases of efficiency engineering, including time studies and routing of materials. Complete machines and machine parts are constructed from drawings and blue prints. A study is made of the different machine tools from assigned catalogue work, with regard to the economical and efficient production of different classes of products.

240. **MACHINE TOOL WORK V.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Machine Tool Work IV (Shop 235). Mr. Sellers and Mr. Jones.

This course is devoted entirely to a systematic study to determine the various time elements that are required in the efficient production of standard machine parts which are being made in the shops.

245, 250. **FACTORY ENGINEERING.** Senior year, first semester. Lectures and recitations, one hour; drafting-room, three hours. Two semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Carlson.

This course deals with the problems of the factory executive, such as the selection, installation, and arrangement of direct and indirect equipment, the standardization of machines and tools, stock and store methods, production orders, routing and dispatching, time study and rate setting, instruction and operation cards, wage systems, cost systems, and the various factors that have to do with the design and control of factories.

255. **FACTORY DESIGN.** Senior year, second semester. Drafting, six hours. Two semester credits. Prerequisite: Factory Engineering (Shop 245, 250). Professor Carlson.

The knowledge gained in the shops and laboratories and in the course in factory engineering is used in the design of a complete factory.

260. **ADVANCED SHOP PRACTICE.** Elective, first semester. Laboratory, nine hours. Three semester credits. Professor Carlson and assistants.

Opportunity is offered those having the necessary preliminary training to specialize to a limited degree along certain lines of Shop Practice, such as the heat treatment of steel, oxyacetylene welding, jig and die work, cutting speeds and feeds, shop management, and systems.

265. **SHOP-PRACTICE RESEARCH.** Elective, both semesters. Laboratory, nine hours. Three semester credits. Professor Carlson and Mr. Sellers.

Those who wish to investigate some phase of shop-practice work in which they are greatly interested are given opportunity to do so. The wonderful improvements in the methods of present-day production amply justify investigative work along this line, and every possible aid will be accorded those wishing to take this work.

Steam and Gas Engineering

Professor POTTER
Professor CALDERWOOD, in charge
Instructor MACK

Instructor HOBBS
Assistant _____

The object of the instruction in this department is to give to the student the fundamental principles underlying the design, construction, selection, operation and testing of steam boilers, steam engines, and steam turbines; gas producers; gas and petroleum engines; compressed-air and refrigerating machinery; condensers and evaporators. These subjects are developed by courses in engineering thermodynamics and in steam and gas engineering, and are followed in the fourth year by courses in power-plant engineering, in refrigeration, and in heating and ventilation. The classroom instruction of every course consists of lectures and recitations, which are paralleled by work in the drafting-room and laboratory, and supplemented by numerous practical problems, trade catalogs, notes, and inspection trips requiring written reports.

STEAM ENGINEERING LABORATORY

In addition to the equipment installed especially for experimental purposes, all the heating, power, ventilating, and pumping equipment of the College subserves the further purpose of experimental work.

There are available for the boiler tests three 125-horsepower high-pressure fire-tube boilers equipped with under-feed, chain-gate, and side-feed stokers; three high-pressure water-tube boilers, one being equipped with a Roney stoker and the others with under-feed stokers. Besides the high-pressure boilers there are eight low-pressure boilers equipped with under-feed stokers. All of these boilers have full equipment of auxiliaries and are provided with pyrometers, draft gauges, flue-gas samplers, and other instruments for research and laboratory work.

The steam engineering laboratory contains fourteen steam engines with different types of valve gears, including plain slide valves, balanced valves, double valves, piston valves, Corliss valves; also a uniflow engine. These engines range in power from 6 to 250 horsepower. There are also three steam turbines equipped with surface condensers, dry vacuum pumps, wet vacuum pumps, and circulating pumps. A compound reciprocating steam engine is also equipped so that it can be operated condensing or noncondensing. The engines in this laboratory are equipped with electric generators or with absorption brakes.

Three ammonia refrigerating machines are available for laboratory work only and a fourth refrigerating machine, which serves the College, is also used for tests and research in refrigeration. One of the laboratory refrigerating machines serves a thermal-testing room, equipped for low temperature experiments.

The laboratory is also provided with various types of steam pumps, steam traps, steam and ammonia indicators, gauges, injectors, planimeters, pyrometers, and apparatus for testing gauges, indicators, and lubricants.

GAS ENGINEERING LABORATORY

The apparatus for gas engineering instruction and research includes a Smith suction gas producer which supplies gas to a 25-horsepower Foos gas engine. This gas engine is equipped with the necessary cylinder heads and other auxiliaries, so that it can be operated with producer gas, natural gas, water gas, and with light and heavy liquid fuels. Besides the Foos experimental engine, the gas engine laboratory includes many different sizes and makes of gas and oil engines.

A Westinghouse air-pump, a complete compressed-air plant driven by an electric motor, and several fans, are available for experiments with air.

The gas engineering laboratory also includes several types of coal calorimeters, a Junkers and a Sargeant gas calorimeter, apparatus for approximate analysis of fuels, oil-testing equipment, a bearing tester, several different types of pyrometers, a variety of gas-engine indicators, Venturi and Pitot tubes.

COURSES IN STEAM AND GAS ENGINEERING

FOR UNDERGRADUATES

101. STEAM AND GAS ENGINEERING I RECITATION. Junior and senior years, first semester. Lectures and recitations, four hours. Four semester credits. Prerequisites: Kinematics (Ap. Mech. 180) and Calculus II (Math 116). Professor Calderwood.

A study of heat power engineering, including steam engines and valve gears; the thermodynamics of gases and vapors; gas and vapor cycles. Texts: Furman's *Valve Gears*, Vol. I, and Hirshfeld and Barnard's *Heat Power Engineering*.

105. STEAM AND GAS ENGINEERING I LABORATORY. Junior and senior years, first semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering I Recitation. Professor Calderwood, Mr. Mack, and Mr. Hobbs.

The study and calibration of steam gauges, indicators, and planimeters; valve-setting and steam-engine operations; study of calorimeters, flow meters, and feed-water heaters; determination of the indicated and brake horsepower, mechanical efficiency, and the steam consumption of high-speed automatic cut-off, Corliss, simple and compound engines; tests of DeLaval, Kerr and Terry steam turbines are included in this course. Text: Carpenter and Diederichs' *Experimental Engineering* is used in this and subsequent laboratory courses.

110. STEAM AND GAS ENGINEERING II RECITATION. Junior and senior years, second semester. Lectures and recitations, three hours. Three semester credits. Prerequisite: Steam and Gas Engineering I. Professor Potter and Professor Calderwood.

This is a continuation of the study of heat-power engineering, including steam turbines; internal-combustion engines; fuels and combustion; boilers and boiler auxiliaries; gas producers; natural and artificial gas; condensers, evaporators; compressed-air and refrigerating machinery. Text: Hirshfeld and Barnard's *Heat-power Engineering*.

115. STEAM AND GAS ENGINEERING II LABORATORY. Junior and senior years, second semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering II Recitation. Professor Calderwood and Mr. Mack.

This course involves the approximate analysis of coal; determination of the calorific values of solid, liquid, and gaseous fuels; evaporative tests of steam boilers; testing of internal-combustion engines, including a study of the various auxiliaries for gas and oil engines; tests of compressed-air and refrigerating machinery.

120. STEAM AND GAS ENGINEERING C RECITATION. Junior and senior years, second semester. Lectures and recitations, two hours. Two semester credits. Prerequisites: Engineering Physics (Physics 212) and Calculus II (Math. 116). Mr. Mack.

A descriptive study is made of steam boilers, steam engines, steam turbines, gas and oil engines, including the various auxiliaries. Text: Allen and Bursley's *Heat Engines*.

125. STEAM AND GAS ENGINEERING C LABORATORY. Junior and senior years, second semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering C Recitation. Mr. Mack and Mr. Hobbs.

The study and calibration of steam gauges, indicators, and planimeters; calorimeters; evaporative tests of steam boilers; determination of the heating value of liquid and gaseous fuels; tests of steam engines; valve setting; tests of steam turbines; tests of internal-combustion engines; operation and testing of refrigerating machines are involved in this course.

130. ELEMENTS OF STEAM AND GAS POWER. Freshman year, both semesters. Lectures, recitations, and laboratory, six hours. Two semester credits. Professor Potter, Professor Calderwood, Mr. Mack, and Mr. Hobbs.

An elementary study is made of steam engines, steam turbines, steam boilers, steam power-plant auxiliaries, gas and oil engines, natural and manufactured gas, gas power-plant auxiliaries, and elements of automotive engineering. Text: Potter and Calderwood's *Elements of Heat-power Engineering*.

170. DAIRY REFRIGERATION RECITATION. Elective, first semester. Lectures and recitations, one hour. One semester credit. Mr. Hobbs.

The elementary theory and principles of operation of various refrigerating and ice-making machinery and of cold storage, with special reference to the dairy industry, are considered.

175. DAIRY REFRIGERATION LABORATORY. Elective, first semester. Laboratory work, three hours. One semester credit. Mr. Hobbs.

Study and operation of various types of refrigeration systems; steam-engine operation, and testing of refrigeration machines.

195. THESIS. Senior year, continuing through both semesters. Professor Potter and Professor Calderwood.

The laboratories of the department are well furnished with apparatus suitable for experimental and research work in the field of heat-power engineering. The subject of the investigation should be selected in consultation with the head of the department at the beginning of the first semester.

FOR GRADUATES AND UNDERGRADUATES

206. POWER-PLANT ENGINEERING. Senior year, first semester. Laboratory, nine hours. Three semester credits. Professor Potter, Professor Calderwood, and Mr. Mack.

One-half of the semester is devoted to complete power-plant testing; special investigations of steam-engine performance; operation of gas

producers, and advanced laboratory work on internal-combustion engines. The remainder of the time is spent in designing a complete power plant.

210. REFRIGERATION, HEATING, AND VENTILATION RECITATION. Senior year, second semester. Lectures and recitations, two hours. Two semester credits. Prerequisite: Steam and Gas Engineering II. Professor Calderwood.

This course is planned to acquaint the student with the fundamental principles of refrigerating systems, and the application of refrigeration to ice making, cold storage, and the cooling of air, liquids, and solids; also the fundamental principles of heating and ventilation, including the direct and indirect systems, hot-air, hot-water and steam systems of heating. Text: Hoffman's *Heating and Ventilation* and notes on refrigeration.

215. REFRIGERATION, HEATING, AND VENTILATION LABORATORY. Senior year, second semester. Laboratory, three hours. One semester credit. Taken with Refrigeration, Heating and Ventilation Recitation. Professor Calderwood and Mr. Mack.

The laboratory work will include tests of refrigerating machinery and of the thermal conductivity of insulating materials; tests on fans and blowers, radiators and house-heating boilers. The remainder of the time will be devoted to the design of heating and ventilating systems for buildings.

FOR GRADUATES

301. ADVANCED THERMODYNAMICS. Elective, first or second semester. Lectures and recitations, two hours. Two semester credits. Professor Calderwood.

A study is made of the advanced phases of engineering thermodynamics, including research work along fundamental properties of gases and vapors. Reports are made of recent investigations along thermodynamic lines.

305. ENGINEERING RESEARCH. Elective, first or second semester. One semester credit for each three hours of laboratory work. Professor Potter, Professor Calderwood, and Mr. Mack.

The laboratory work is correlated with the work of the Engineering Experiment Station. Investigations on lubricants, fuels, combustion, internal-combustion engines, steam engines, steam turbines, steam boilers, gas producers, refrigeration, heat insulating materials, heating and ventilation, compressed air and similar subjects are carried on.

Engineering in the Summer School

In order to encourage the introduction of manual training and industrial drawing in the common schools and high schools of the State, and to improve the quality of work now being given, the College offers summer courses in mechanical drawing, manual training and shop practice for high-school and grade teachers.

In addition various courses required in the several engineering curricula are offered in the Summer School. This enables teachers who wish to take an engineering curriculum to get a considerable start on the work during their summer vacations, and also enables College students who are irregular to make up their back courses.

For full information in regard to the courses offered, see the section of this catalogue devoted to the Summer School. A special circular giving details concerning the Summer School may be had upon application to the Vice President of the College.

Special Courses Related to Engineering

Special short courses dealing with automobile repair, tractor operation, carpentry, machine-shop work, foundry practice, blacksmithing, telegraphy, radio-telegraphy, and electrical repair work are grouped with other special courses in another part of this catalogue, and are there described in detail. Reference should be made to the general index in the back of this book. A special circular describing this work may be had on application to the Vice President of the College.

Division of Home Economics

HELEN BISHOP THOMPSON, *Dean*

Modern research in the sciences and present-day development of the industries, arts, and professions have brought a recognition of the value of technical training as a part of the preparation for life's work. An educational plan which combines industrial, technical, and scientific subjects with the older general studies results to the student in the power to express, in everyday activities, the knowledge acquired in the classroom. It increases the capacity for productive work and develops the desire to realize in practical form the theories and principles studied. The aim of a collegiate course in home economics is not merely to increase the student's stock of information, but to stimulate interest in continued study or research, to train in accuracy in detail, to teach discrimination with regard to criteria by which to interpret results of work, and to cultivate an attitude of economic and social responsibility.

The course as outlined below is arranged to meet the needs of the following groups of students: those who wish to teach, those who wish to enter graduate courses leading to technical or professional work, and those who wish to apply their knowledge to various problems of home life or in fields of industry and social service in which an understanding of home-economics subjects is essential to intelligent action. While emphasis is laid on the material and practical side of life, the training does not stop here. The young women are constantly reminded that life is not drudgery; that technical knowledge and scientific skill even fail to include the full meaning of education in its highest sense. They are taught that any training that fails to develop harmoniously body, mind, and spirit is inadequate and incomplete. They are brought face to face with ideals as well as with actualities, and are made to see that, while skillful labor gives dignity to life, grace, refinement, and self-poise are the highest requisites for true service.

The training given is as varied as it is broad. It includes a knowledge of the laws of health, an understanding of the sanitary requirements of the home; the study of values, both absolute and relative, of the various articles used in the home; the wise expenditure of money, time, and energy; the scientific principles underlying the selection and preparation of food; the right care of children; and the ability to secure efficient service from others. Instruction is methodical and thorough, and is suited to the circumstances of the students. Experience shows that such training teaches contentment, industry, order, and cleanliness, and fosters a woman's independence and feeling of responsibility.

The work in home economics includes:

A four-year curriculum, leading to the degree of bachelor of science.

A three-year curriculum, in the School of Agriculture.

A one-year curriculum in lunch-room management, for which a certificate is granted.

A housekeepers' course, about fifteen weeks in length, for which a certificate of proficiency is granted.

CURRICULUM IN HOME ECONOMICS

The training in the four-year curriculum is both general and specific. Since scientific training is fundamental in the intelligent and successful administration of the home, strong courses in the sciences are given as a foundation for the special training in home economics. To the end that well-rounded culture may be attained, courses in English, history, economics, sociology, and psychology receive due prominence. The time of the student is about equally divided among the purely technical subjects, the fundamental sciences, and studies of general interest. The courses in the related subjects are given in the different departments of the College, while the technical courses are given by the home economics departments. In the junior and senior years opportunity is given for choice of electives, which makes it possible for students to specialize in some chosen line. To this end electives are to be chosen in groups combined logically in courses approved by the Faculty or by the student's dean.

The four-year curriculum is recommended for all who desire to teach home economics, or to undertake any phase of institutional work.

The College does not assume the responsibility of insuring employment to graduates, but the latter rarely experience difficulty in obtaining remunerative positions as instructors in home economics, as dietitians, or as professional housekeepers.

Curriculum in Home Economics

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | SECOND SEMESTER |
|----------------------------------|-----------------------------------|
| College Rhetoric I | College Rhetoric II |
| Engl. 101 3(3-0) | Engl. 104 3(3-0) |
| Chemistry I | Chemistry II |
| Chem. 101 5(3-6) | Chem. 102 5(3-6) |
| Design or Design A | Household Physics |
| Ap. Art 101 or 106..... 3(1-6) | Physics 101 4(3-3) |
| Foods I | Clothing I |
| Food and Nut. 101..... 3(1-6) or | Clo. and Text. 101..... 2(1-3) or |
| Elem. Hygiene and Home Nursing* | House Furnishings* |
| Hshld. Econ. 103..... 3(3-0) | Ap. Art 108..... 2(1-3) |
| Library Methods | Costume Design |
| Lib. Ec. 101..... 1(1-0) | Clo. and Text. 106..... 2(0-6) |
| Current History | Physical Education W-II |
| Hist. 126 1(1-0) | Phys. Ed. 152A..... 1(0-3) |
| Physical Education W-I | |
| Phys. Ed. 151A..... 1(0-3) | |

* The substitution of these courses for the courses in Foods I and Clothing I must first have the approval of the Dean of the Division.

SOPHOMORE

FIRST SEMESTER

| | |
|--------------------------|--------|
| Organic Chemistry HE | |
| Chem. 121 | 5(3-6) |
| English Literature HE-I | |
| Engl. 177 | 3(3-0) |
| General Zoölogy | |
| Zoöl. 105 | 5(3-6) |
| Clothing II | |
| Clo. and Text. 111..... | 3(1-6) |
| Physical Education W-III | |
| Phys. Ed. 153..... | 1(0-3) |

SECOND SEMESTER

| | |
|---------------------------|--------|
| Foods II | |
| Food and Nut. 106..... | 5(3-6) |
| English Literature HE-II | |
| Engl. 180 | 3(3-0) |
| Embryology and Physiology | |
| Zoöl. 108 | 5(3-6) |
| Gardening | |
| Hort. 122 | 3(3-0) |
| Physical Education W-IV | |
| Phys. Ed. 154..... | 1(0-3) |

JUNIOR

FIRST SEMESTER

| | |
|------------------------|-----------|
| German I* | |
| Mod. Lang. 101..... | 3(3-0) or |
| French I* | |
| Mod. Lang. 151..... | 3(3-0) |
| Human Nutrition | |
| Food and Nut. 112..... | 3(3-0) |
| Household Microbiology | |
| Bact. 121 | 5(3-6) |
| Economics | |
| Econ. 101 | 3(3-0) |
| Elective | 3(-) |

SECOND SEMESTER

| | |
|-------------------------|-----------|
| German II* | |
| Mod. Lang. 102..... | 3(3-0) or |
| French II* | |
| Mod. Lang. 152..... | 3(3-0) |
| Household Management | |
| Hshld. Econ. 106..... | 2(2-0) |
| Textiles | |
| Clo. and Text. 116..... | 3(2-3) |
| Psychology | |
| Educ. 101 | 3(5-0) |
| Elective | 6(-) |

SENIOR

FIRST SEMESTER

| | |
|------------------------|-----------|
| German Readings | |
| Mod. Lang. 111..... | 3(3-0) or |
| French Readings | |
| Mod. Lang. 161..... | 3(3-0) |
| American History | |
| Hist. 101 | 3(3-0) |
| Dietetics | |
| Food and Nut. 201..... | 5(3-6) |
| Elective | 6(-) |

SECOND SEMESTER

| | |
|------------------------------|---------|
| American Government | |
| Hist. 151 | 3(3-0) |
| Sanitation and Public Health | |
| Hshld. Econ. 211..... | 3(3-0) |
| Elective | 11(-) |

Groups of Electives for Students in the Division of Home Economics

The groups given below are selected with a view to training students for the vocations in which home economics may be directly applied.

A sufficient number of hours may be chosen from any group to fill the elective requirement, or a smaller number of hours may be taken from a group and, for the remaining elective hours, advanced courses of related subject matter may be chosen.

Music may be added to any group.

* Students who have offered French or German for entrance should take advanced courses in modern language, the courses which they take depending upon their preparation. Students who under these circumstances take less than nine semester credits in modern language are required to take additional elective hours, so that their total requirement is the same as for other students.

Advertising, Buying, and Salesmanship

| FIRST SEMESTER | | SECOND SEMESTER | |
|----------------------------|--------|---------------------------|--------|
| Design A | | Principles of Advertising | |
| App. Art 106..... | 3(1-6) | Ind. Jour. 125..... | 3(3-0) |
| Clothing Salesmanship | | Advertising English | |
| Clo. and Text. 130..... | 2(2-0) | Engl. 125 | 3(3-0) |
| Business English | | Applied Psychology | |
| Engl. 122 | 3(3-0) | Educ. 215 | 2(2-0) |
| Oral English I | | Accounting Practice | |
| Engl. 128 | 3(3-0) | Math. 134 | 3(3-0) |
| Industrial Feature Writing | | Business Management | |
| Ind. Jour. 123..... | 2(2-0) | Econ. 126 | 2(2-0) |
| Technical Writing | | | |
| Engl. 207 | 2(2-0) | | |

Certificate Requirements for Vocational Home Economics Teaching

| | | | |
|--------------------------------|--------|--------------------------------|-----------|
| Educ. Administration I | | Educ. Psychology | |
| Educ. 105..... | 3(3-0) | Educ. 109..... | 3(3-0) or |
| Educ. Electives..... | 3(3-0) | Educ. Sociology I | |
| Electives in Home Economics or | | Educ. 118..... | 3(3-0) |
| Modern Language..... | 3(3-0) | Special Methods in Teaching of | |
| | | Home Economics | |
| | | Educ. 132..... | 3(3-0) |
| | | Practice Course in Household | |
| | | Management | |
| | | Hshld. Econ. 116..... | 3(0-9) |
| | | Supervised Observation and | |
| | | Teaching in Home Economics | |
| | | Educ. 169..... | 3(-) |
| | | Problems in Child Welfare | |
| | | Hshld. Econ. 201..... | 3(2-0) |
| | | Electives in Home Economics, | 2(2-0) |

Clothing and Textile Work

| | | | |
|-----------------------------|--------|-----------------------------|--------|
| Household Entomology | | Principles of Art and their | |
| Ent. 106..... | 2(2-0) | Application | |
| Modern Problems of the | | Ap. Art 124..... | 3(3-0) |
| Household | | Labor Problems | |
| Hshld. Econ. 236..... | 2(2-0) | Econ. 111..... | 2(2-0) |
| Clothing Salesmanship | | European Industrial History | |
| Clo. and Text. 130..... | 2(2-0) | Hist. 224..... | 3(3-0) |
| Problems in Hygiene of | | Clothing Economics | |
| Clothing I | | Clo. and Text. 236..... | 2 to 4 |
| Clo. and Text. 240..... | 2 to 4 | Problems in Hygiene of | |
| American Industrial History | | Clothing II | |
| Hist. 105..... | 3(3-0) | Clo. and Text. 244..... | 2 to 4 |
| | | Social Problems | |
| | | Econ. 257..... | 2(2-0) |

Designing and Decorating

| | | | |
|----------------------------|--------|------------------------------|--------|
| Freehand Drawing I | | Freehand Drawing II• | |
| Arch. 111..... | 2(0-6) | Arch. 114..... | 2(0-6) |
| Woodwork I | | Woodwork II | |
| Shop 105..... | 1(0-3) | Shop 110..... | 1(0-3) |
| Photography | | Principles of Art and their | |
| Physics 120..... | 2(1-3) | Application | |
| Landscape Gardening I | | Ap. Art 124..... | 3(3-0) |
| Hort. 125..... | 2(0-6) | Landscape Gardening II | |
| Principles of Topography I | | Hort. 301..... | 3(0-9) |
| Ind. Jour. 101..... | 3(2-3) | Principles of Topography II | |
| | | Ind. Jour. 104..... | 3(2-3) |
| | | Handicraft | |
| | | Ap. Art 112..... | 2(0-6) |
| | | Interior Decoration and | |
| | | Furnishing | |
| | | Ap. Art 114..... | 3(1-6) |
| | | The Arts and Crafts Movement | |
| | | Engl. 295..... | 3(3-0) |

Food and Nutrition

(Research; Hospital Dietetics; Public Health Work; Specialized Teaching)

| | | | |
|------------------------------|--------|-------------------------|---------|
| Physical Chemistry | | Physiological Chemistry | |
| Chem. 206 | 5(3-6) | Chem. 231 | 5(3-6) |
| Microchemical Methods of | | Biochemical Preparation | |
| Analysis | | Chem. 234 | 5(0-15) |
| Chem. 245 | 1(0-3) | Quantitative Analysis | |
| Anatomy and Physiology | | Chem. 241 | 5(1-12) |
| Anat. 131 | 3(2-3) | Food Analysis | |
| Hygienic Bacteriology | | Chem. 257 | 3(0-9) |
| Bact. 206 | 4(2-6) | Household Chemistry | |
| Investigations in Food | | Chem. 265 | 3(1-6) |
| Economics and Nutrition I | | Histology I | |
| Food and Nut. 246..... | 2 to 4 | Path. 101 | 3(1-6) |
| Food Economics and Nutrition | | | |
| Seminar I | | | |
| Food and Nut. 251..... | 2(2-0) | | |

Homemaking

| | | | |
|---------------------------|--------|-----------------------------|--------|
| Problems in Child Welfare | | Interior Decoration and | |
| Hshld. Econ. 201..... | 3(3-0) | Furnishing | |
| Hygiene and Home Nursing | | Ap. Art 114..... | 3(1-6) |
| Hshld. Econ. 209..... | 3(3-0) | Principles of Art and their | |
| Modern Problems of the | | Application | |
| Household | | Ap. Art 124..... | 3(3-0) |
| Hshld. Econ. 236..... | 2(2-0) | History of the Home | |
| Household Entomology | | Hist. 225 | 3(3-0) |
| Ent. 106 | 2(2-0) | Household Chemistry | |
| Sociology | | Chem. 265 | 3(1-6) |
| Econ. 151 | 3(3-0) | Pathology of Vegetable Food | |
| | | Products | |
| | | Bot. 121 | 3(1-6) |
| | | Rural Sociology | |
| | | Econ. 156 | 3(3-0) |
| | | Community Problems | |
| | | Econ. 260 | 1(1-0) |
| | | Clothing III | |
| | | Clo. and Text. 124..... | 3(1-6) |

Homemaking

(Special Rural Problems)

| | | | |
|--------------------------|--------|---------------------------|---------|
| Poultry Bacteriology | | Plant Propagation | |
| Bact. 216 | 3(1-6) | Hort. 101 | 3(2-3) |
| Rural Sociology | | Orcharding | |
| Econ. 156 | 3(3-0) | Hort. 107 | 2(1-3) |
| Hygiene and Home Nursing | | Small Fruits | |
| Hshld. Econ. 209..... | 3(3-0) | Hort. 110 | 2(2-0) |
| Rural Organization | | Market Gardening | |
| Educ. 222 | 2(2-0) | Hort. 210 | 3(2-3) |
| Rural Leadership | | Home Dairying | |
| Educ. 224 | 1(1-0) | Dairy Husb. 112..... | 1½(2-3) |
| | | Home Poultrying | |
| | | Poult. Husb. 102..... | 1½(3-0) |
| | | Dairy Bacteriology | |
| | | Bact. 211 | 3(1-6) |
| | | Apiculture | |
| | | Ent. 111 | 3(2-3) |
| | | Farm Sanitation and Water | |
| | | Supply | |
| | | Farm Eng. 119..... | 2(2-0) |

Institutional Management

| | | | | | | | |
|----------------------------|--------|--|--|-----------------------------------|--------|--|--|
| Institutional Management I | | | | Institutional Management II | | | |
| Hshld. Econ. 221..... | 3(1-6) | | | Hshld. Econ. 226..... | 4(3-3) | | |
| Business English | | | | Special Problems in Institutional | | | |
| Engl. 122 | 3(3-0) | | | Administration | | | |
| Oral English I | | | | Hshld. Econ. 246..... | 2 to 5 | | |
| Engl. 128 | 3(3-0) | | | Institutional Furnishings | | | |
| Business Management | | | | Ap. Art 203..... | 3(1-6) | | |
| Econ. 126 | 2(2-0) | | | Institutional Accounting | | | |
| Technical Writing | | | | Math. 131 | 3(3-0) | | |
| Engl. 207 | 2(2-0) | | | Advertising English | | | |
| | | | | Engl. 125 | 3(3-0) | | |
| | | | | Applied Psychology | | | |
| | | | | Educ. 215 | 2(2-0) | | |
| | | | | Labor Problems | | | |
| | | | | Econ. 111 | 2(2-0) | | |

Lecturing and Demonstrating

| | | | | | | | |
|--------------------|--------|--|--|---------------------|--------|--|--|
| Oral English I | | | | Oral English II | | | |
| Engl. 128 | 3(3-0) | | | Engl. 131 | 3(3-0) | | |
| Public Speaking I | | | | Public Speaking II | | | |
| Pub. Spk. 101..... | 2(2-0) | | | Pub. Spk. 102..... | 2(2-0) | | |
| Extempore Speech I | | | | Extempore Speech II | | | |
| Pub. Spk. 106..... | 2(2-0) | | | Pub. Spk. 108..... | 2(2-0) | | |
| Sociology | | | | Applied Psychology | | | |
| Econ. 151 | 3(3-0) | | | Educ. 215 | 2(2-0) | | |
| Technical Writing | | | | Rural Sociology | | | |
| Engl. 207 | 2(2-0) | | | Econ. 156 | 3(3-0) | | |
| | | | | Community Problems | | | |
| | | | | Econ. 260 | 1(1-0) | | |

Sanitary Science; Food and Market Inspection

| | | | | | | | |
|-------------------------|--------|--|--|-------------------------------|-----------|--|--|
| Hygienic Bacteriology | | | | Dairy Chemistry | | | |
| Bact. 206 | 4(2-6) | | | Chem. 254 | 3(1-6) | | |
| Quantitative Analysis I | | | | Chemistry of Meats | | | |
| Chem. 150 | 2(0-6) | | | Chem. 255 | 3(1-6) | | |
| | | | | Food Analysis | | | |
| | | | | Chem. 257 | 3(0-9) | | |
| | | | | Pathogenic Bacteriology I | | | |
| | | | | Bact. 111 | 4(2-6) | | |
| | | | | Water Purification and Sewage | | | |
| | | | | Disposal | | | |
| | | | | Bact. 221 | 3(1-6) | | |
| | | | | Pathology of Vegetable Food | | | |
| | | | | Products | | | |
| | | | | Bot. 121 | 3(1-4, 2) | | |
| | | | | Meat Inspection | | | |
| | | | | Path. 216 | 2(2-0) | | |

Social Welfare Work

| | | | | | | | |
|----------------------------|--------|--|--|--------------------------------|--------|--|--|
| Problems in Child Welfare | | | | Labor Problems | | | |
| Hshld. Econ. 201..... | 3(3-0) | | | Econ. 111 | 2(2-0) | | |
| Hygiene and Home Nursing | | | | Current Economic Problems | | | |
| Hshld. Econ. 209..... | 3(3-0) | | | Econ. 225 | 2(2-0) | | |
| Modern Problems of the | | | | Rural Sociology | | | |
| Household | | | | Econ. 156 | 3(3-0) | | |
| Hshld. Econ. 236..... | 2(2-0) | | | Social Problems | | | |
| Investigation in Household | | | | Econ. 257 | 2(2-0) | | |
| Economics | | | | Community Problems | | | |
| Hshld. Econ. 241..... | 2 to 5 | | | Econ. 260 | 1(1-0) | | |
| Sociology | | | | Modern Europe | | | |
| Econ. 151 | 3(3-0) | | | Hist. 223 | 3(3-0) | | |
| Pan-America | | | | Immigration and International | | | |
| Hist. 207 | 2(2-0) | | | Relations | | | |
| Rural Organization | | | | Hist. 228 | 2(2-0) | | |
| Educ. 222 | 2(2-0) | | | Investigation in Household | | | |
| Rural Leadership | | | | Economics | | | |
| Educ. 224 | 1(1-0) | | | Hshld. Econ. 241..... | 2 to 5 | | |
| | | | | Investigation in Child Welfare | | | |
| | | | | Hshld. Econ. 251..... | 2 to 5 | | |

State Certificate Requirements for General Teaching

| | |
|--|------------------------|
| Educational Administration I | Educational Psychology |
| Educ. 105 3(3-0) | Educ. 109 3(3-0) |
| | Educational Sociology |
| | Educ. 118 3(3-0) |
| Additional Educational Courses..... 9(9-0) | |

(NOTE.—Home Economics Education (2 hrs.) and Special Methods in the Teaching of Home Economics (3 hrs.) should be included by students who wish to teach home economics. Modern Europe or Advanced English should be added by those expecting to teach these subjects. Additional courses may be chosen in the line of the student's interests.)

Applied Art

Professor HOLMAN
Instructor AVERILL¹

Instructor SHELL²
Assistant EVERHARDY

Taste is cultivated through the impressions received in everyday surroundings and not through the occasional visits to art galleries. We are not so sensitive to discords in color and line as we are to discords in sound, because we have not trained our eyes as we have our ears. "The study of design furnishes a means of exercising and thus developing good taste in connection with the things which make up environment of everyday life and of awakening appreciation in nature and in art." Home decoration is a study of the factors which produce beautiful surroundings that make for enjoyment and peace. Each course consists of lectures, studio laboratory work, field observation work, and reading.

COURSES IN APPLIED ART

FOR UNDERGRADUATES

101. DESIGN. Freshman year, first semester. Class work, one hour; studio, six hours. Three semester credits. Professor Holman and Miss Averill.

A study is made of the principles which control the use of color and the selection and arrangement of elements in the production of objects themselves and in their uses as parts of a whole. Many exercises are given in which clothing and home furnishings are scored as to design. A natural motif is adapted to material, function and form.

106. DESIGN A. Freshman year, first semester. Class work, one hour; studio, six hours. Three semester credits. To be taken as a substitute for Design by students who have had color and design work in high school. Professor Holman and Miss Averill.

A further study is made of harmonies, adaptation of natural motifs, and design as applied to fabrics and other materials. Art masterpieces and articles of common use are studied according to the principles of design and color.

108. HOUSE FURNISHINGS Freshman year, second semester. Class work, one hour; studio, three hours. Two semester credits. Prerequisite: Design or Design A. Professor Holman.

Design is the selection and arrangement of materials for the making of useful and beautiful things. The decorative phase of design is studied in the solving of problems which occur in the furnishings of the house.

1. Absent on leave, November 1, 1919, to May 31, 1920.

2. Temporary appointment, November 1, 1919, to May 31, 1920.

112. **HANDICRAFT.** Elective, second semester. Studio, six hours. Two semester credits. Prerequisite: Design or Design A. Miss Averill.

Both constructive and decorative designs are studied in handicraft work. Original designs are carried out in the following mediums: leather, clay, metal, reeds, and other materials.

114. **INTERIOR DECORATION AND FURNISHING.** Elective, second semester. Class work, one hour; studio, six hours. Three semester credits. Prerequisite: Design or Design A. Professor Holman.

This is a study of color, form and arrangement of home furnishings. Wall coverings, carpets, pictures, furniture, etc., are discussed and studied so that the student may recognize and appreciate what is appropriate and beautiful. A study is made of fine arts, of handicrafts, and of the history of furnishings. Problems in spacing and coloring of side walls are discussed and are developed in water color and decorating materials.

116. **INSTITUTIONAL FURNISHINGS.** Elective, second semester. Class work, one hour; studio, six hours. Three semester credits. Prerequisite: Design or Design A. Professor Holman.

A study is made of the fundamental principles of design, including color, form, and arrangement. These principles are applied to problems involving the selection and use of the following: wall, floors, furniture, finishes, coverings, linen, china, and silver.

120. **SKETCHING.** Elective, second semester. Studio, six hours. Two semester credits. Prerequisite: Design or Design A. Professor Holman.

Objects are sketched singly and in groups in the studio and out of doors. The media employed are pencil, charcoal, and brush. The aim is to train the student to see forms in perspective and to represent them with sufficient accuracy to apply in illustrating the more practical problems in the other courses in the department.

124. **PRINCIPLES OF ART AND THEIR APPLICATION.** Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Design or Design A. Professor Holman.

A general survey is made of art periods as an index to what the art quality is. An examination is made of the religious, political, and social aspects of art expression. Architecture, furniture, textiles, sculpture, pictures, and the lesser art objects are compared as to their art quality. The modern fields of landscape, architecture, furnishings, clothing, advertising, etc., are surveyed. The principles controlling art expression are applied to these modern fields of life.

Clothing and Textiles

Professor BIRDSALL
Associate Professor COWLES
Instructor FECHT
Instructor McDONALD

Instructor HARRISON
Instructor HUNT
Assistant WORCESTER

The object of the instruction in clothing and textiles is to give young women a practical knowledge of the selection of materials, of the growing of textile fibers, and of the processes used in their manufacture into fabrics. The course also includes problems in garment construction, the history of typical forms in dress, costume design and individualization, the selection, care, and renovation of factory-made garments, clothing budgets, the economic and sociological phases of the clothing industries.

COURSES IN CLOTHING AND TEXTILES

FOR UNDERGRADUATES

101. CLOTHING I. Freshman year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Associate Professor Cowles, Miss McDonald, Miss Harrison, and Miss Worcester.

It is the purpose of this course to train the student in the handling of sewing equipment and in efficient methods of work. Attention is given to the taking of measurements, development of patterns, and the adaptation of commercial patterns to individual characteristics in form. The kinds, qualities, and quantities of material suitable for making different garments are discussed.

Laboratory.—Construction of unlined garments; millinery; remodeling and repairing of worn clothing. Labor-saving methods and rapid construction are emphasized. Time studies and speed tests are required.

106. COSTUME DESIGN. Freshman year, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Design (Ap. Art 101) or Design A (Ap. Art 106). Miss Hunt.

This course treats of art in dress and comprises the application of the principles of color, harmony and design; individual requirements in color and line; comparative design of ancient and modern costumes; original problems in designs for embroidering; sketching of costumes in pencil, pen and ink, and water colors. This course is directly related to the construction of garments.

111. CLOTHING II. Sophomore year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Associate Professor Cowles, Miss Harrison, Miss McDonald, and Miss Worcester.

This course considers the manufacture and selection of clothing; clothing industries and clothing standards in their relation to the economic and social life of the community; comparison of home- and factory-made garments; hygienic factors involved in clothing; standardization of dress, its advantages and disadvantages; clothing budgets for individuals and family groups.

Laboratory.—The laboratory consists of group work in making entire outfits of clothing for individuals of different ages or the planning and making of the garments required in the wardrobe of a family.

116. TEXTILES. Junior year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Organic Chemistry. Miss Fecht.

This course considers the historical and economic development of the textile industry, from primitive ages to the present time. The combination of art, science, and mechanics that makes possible the elaborateness of modern textiles is given careful attention.

Laboratory.—The behavior of textile fibers toward various chemical reagents is studied. Physical and microscopic tests are made for the identification of fibers. Bleaching and dyeing; laundry processes as they affect color, shrinkage, strength, etc.; and analysis of mixed goods are likewise considered in the laboratory work.

120. CLOTHING LABORATORY TECHNIQUE. Elective, both semesters. Laboratory, three hours. One semester credit. To accompany Educ. 132. Professor Birdsall.

This course is offered to all students preparing to teach clothing and textiles in grade and high school. The course has as its aim the development of technique and the making of illustrative material for use in the teaching of these courses.

124. CLOTHING III. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: Clothing I and Costume Design. Miss Harrison and Miss McDonald.

The development of costume, including a survey of the ancient Egyptian, Grecian, Roman, and early modern French costumes and present-day modes, is treated historically.

Laboratory.—The laboratory deals with the adaptation of materials to the individual and aims to teach self expression through dress. Students are expected to execute original designs in materials approved by the instructor. Those who so desire may devote one laboratory period each week, or both, to the design and construction of millinery.

130. CLOTHING SALESMANSHIP. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Clothing II. Miss Hunt.

This course provides instruction to those who wish to prepare themselves for positions as educational or departmental directors in large stores, service managers in factories, or teachers of salesmanship. Actual practice in department stores followed by reports and conferences; study of department systems and policy, based on observation, together with a certain amount of practical experience, is required of all students.

FOR GRADUATES AND UNDERGRADUATES

236. CLOTHING ECONOMICS. Elective, both semesters. From two to four semester credits, depending upon the work done. Prerequisites: Textiles and General Economics. Associate Professor Cowles.

This course includes a study of the organization of the clothing trades and industries; of wholesale and retail clothing markets; of wages and standards of efficiency in workmanship; conditions of work in the textile and clothing industries; standardization of fabrics; study of the budget for clothing and household textiles. Topics are assigned for reading and investigation and written reports are required.

240. PROBLEMS IN HYGIENE OF CLOTHING I. Elective, first semester. From two to four semester credits. Prerequisites: Clothing II, Embryology and Physiology, and Microbiology. Associate Professor Cowles.

Students are assigned special problems for investigation of clothing in relation to health and its effect upon anatomical form, muscular development, and physiological functions.

244. PROBLEMS IN HYGIENE OF CLOTHING II. Elective, second semester. From two to four semester credits. Prerequisite: Problems in Hygiene of Clothing I or its equivalent.

This course may be taken as a continuation of Course 240, or may be elected independently by students in Sanitation and Public Health or General Physiology.

Food Economics and Nutrition

Professor BOGERT
Associate Professor ROTHERMEL
Assistant Professor PITTMAN
Instructor SKINNER¹
Instructor GREEN²
Instructor PERRY

Instructor ROUSE³
Instructor OTTO³
Assistant TRAIL
Assistant WILLIAMS
Fellow THOMAS

Food is one of the determining factors in the health of the individual and of the family. The selection of wholesome and economical food requires the constant application of chemistry and of sanitary science. The preparation and preservation of food involve processes dependent upon physics, chemistry, and bacteriology. In the modern science of nutrition and dietetics, the student learns the chemical and physiological principles involved in the nutritive processes of the body and the quanti-

1. Absent on leave, first semester, 1919-'20.

2. Absent on leave, 1919-'20.

3. Temporary appointment.

tative application of these principles in planning food for the individual and the group. Science, applied science, and practice are presented in their proper relations in order to train the student in fundamental principles and to enable her to gain by experience methods of translating these principles into her everyday household practices. Advanced courses in this department provide for vocational and professional positions.

COURSES IN FOOD ECONOMICS AND NUTRITION

FOR UNDERGRADUATES

101. **FOODS I.** Freshman year, both semesters. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: entrance credit in Physics; parallel, Chemistry I. Miss Skinner, Miss Otto, and Miss Thomas.

The application of heat to various food principles is the basis of study in this course. The economic uses of the various foodstuffs is emphasized, as is also the study of commercially prepared food products.

Laboratory—Experimental and practical cookery, illustrating this course, forms the basis of the laboratory work.

106. **FOODS II.** Sophomore year, second semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisites: Organic Chemistry, Foods I or its equivalent. Assistant Professor Pittman, Miss Williams, and Miss Trail.

This course emphasizes the classification, composition, occurrence, and general properties of foodstuffs. Food values in relation to cost are considered, together with the legal and sanitary aspects of food products handled in commerce.

Laboratory.—Food products are handled in experiments which demonstrate the presence of the proximate principles and the various inorganic constituents, the changes they undergo in cooking, and their nutritive value as affected by admixture with other food materials. Recipes are compiled. Practice is given in judging food preparations.

112. **HUMAN NUTRITION.** Junior year, both semesters. Lectures and recitations, three hours. Three semester credits. Prerequisites: Organic Chemistry, Embryology and Physiology, and Foods II.* Dean Thompson and Professor Bogert.

This course comprises a study of the special characteristics and nutritive functions of the food constituents; the methods of investigation which have established the quantitative basis in dietetics; the digestive and metabolic processes and products with emphasis upon energy relations; the quantitative relations of the ash constituents; nitrogen and mineral balances; comparative economy in nutrition and growth of different types of food materials.

FOR GRADUATES AND UNDERGRADUATES

201. **DIETETICS.** Senior year, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisite: Human Nutrition. Associate Professor Rothermel and Miss Perry.

This course deals with the application of the principles of human nutrition to the practical feeding problems of the individual and the group. The following topics receive attention: daily food requirements in health and in disease throughout infancy, childhood, adolescence, adult life, and old age; typical dietaries for each period of life; milk formulæ; the problem of satisfying the diverse requirements in families and other groups.

* Students from other divisions desiring to elect Human Nutrition may substitute an equivalent number of hours in other sciences for Embryology and Physiology, and Foods II.

Laboratory.—Studies in weight measures and cost of some of the common food materials; calculations and quantitative preparation of standard portions and combinations of foods; analyses of recipes; computation and scoring of dietaries with special regard to nutritive requirements for varying physiologic, economic, and social conditions; practice in marketing and serving, comprise the work in the laboratory. (Graduate students are required to do an assigned problem in place of the practice in marketing and serving included in the laboratory for undergraduates.)

241. SPECIAL INVESTIGATIONS IN FOODS I. Elective, first semester. From one to three semester credits. Hours to be arranged. Prerequisite: Human Nutrition. Assistant Professor Pittman.

Special problems are assigned to students for individual consideration.

242. SPECIAL INVESTIGATIONS IN FOODS II. Elective, second semester. From one to three semester credits. Hours to be arranged. Prerequisite: Human Nutrition. Assistant Professor Pittman.

This course may be taken as a continuation of Course 241 or may be elected independently.

246. INVESTIGATIONS IN FOOD ECONOMICS AND NUTRITION I. Elective, first semester. From two to five semester credits, depending upon the nature of the problem. Conferences, laboratory work, and reports. Open to senior and graduate students. Dean Thompson and Professor Bogert.

The work of this course may consist of an assigned problem in the nutritive value of foods; a feeding experiment; dietary studies; or practice in the methods commonly used in the simpler experiments in nutrition.

247. INVESTIGATIONS IN FOOD ECONOMICS AND NUTRITION II. Elective, second semester. From two to five semester credits, depending upon the nature of the problem. Conferences, laboratory work, and reports. Open to senior and graduate students. Dean Thompson and Professor Bogert.

This course may be taken as a continuation of course 246 or may be elected independently.

251. FOOD ECONOMICS AND NUTRITION SEMINAR I. Elective, first semester. Class work, two hours. One or two semester credits. Prerequisite: Human Nutrition. Dean Thompson and Professor Bogert.

This is a course of assigned reading and discussion of topics in the fields of food economics and nutrition. Special attention is given to recent literature, which bears upon problems in dietetics, in both normal and pathological conditions; upon growth and upon normal and subnormal nutrition in infancy and childhood. Feeding experiments are compared and discussed. A reading knowledge of modern languages, while not a fixed requirement, is urged as of especial advantage in this course.

252. FOOD ECONOMICS AND NUTRITION SEMINAR II. Elective, second semester. Class work, two hours. One or two semester credits. Prerequisite: Human Nutrition. Dean Thompson and Professor Bogert.

This course may be taken as a continuation of course 251 or may be elected independently.

Household Economics

Professor KNEELAND
Associate Professor REYNOLDS*
Instructor MCCOY
Instructor WARD

Instructor FORD†
Assistant BALDWIN
Fellow ANDERSON

The successful administration of the home, whether it be for the family or for the larger institutional group, depends upon the wise expenditure of time, money, and effort, the maintenance of healthful and comfortable home conditions, and appreciation of the importance and relation of the home to the rest of society. The courses in this department, therefore, apply the principles of economics, sociology and sanitary science to the problems of household and institutional management, child welfare, and home nursing and sanitation.

Throughout the work, effort is made to develop the student's ability to carry into practice the principles of home making. Interest in community service and in industrial and social problems is stimulated. Students who plan to do executive work as directors of residence, institutional or lunch-room managers, visiting housekeepers, or hospital dietitians will find suitable electives in this department.

COURSES IN HOUSEHOLD ECONOMICS

FOR UNDERGRADUATES

103. **ELEMENTARY HYGIENE AND HOME NURSING.**‡ Freshman year, first semester. Class work, three hours. Three semester credits. Associate Professor Reynolds.

Emphasis is placed upon personal hygiene as a means of maintaining and improving health in the home. Practical methods of preventing disease and of dealing with accidents are investigated and demonstrated. Standards of health are studied and demonstrations are given in the home care of the sick and convalescent.

106. **HOUSEHOLD MANAGEMENT.** Junior year, both semesters. Class work, two hours. Two semester credits. Prerequisite: Foods II. Recommended to precede or parallel: Economics. Professor Kneeland.

This course includes a study of the evolution of the home and its present functions and problems; the organization and simplification of housework through efficient methods of housekeeping and arrangement of equipment and through the use of labor-saving devices; problems of household service; experiments in coöperative laundering, cooking, cleaning, etc.; the expenditures of the household, and household budgets and accounts; the use of time freed from housework.

116. **PRACTICE COURSE IN HOUSEHOLD MANAGEMENT.** Elective, both semesters. Three semester credits. Prerequisite: Foods II. Recommended to precede or parallel: Household Management. Miss McCoy.

This course is conducted in the practice house. The students live in a group and perform the usual household tasks, including marketing, planning, cooking and serving meals, caring for the rooms, planning the household budget, and keeping the accounts. Students who wish to qualify as teachers under the Smith-Hughes requirements for vocational high schools are required to take this course.

* Resigned, February 13, 1920.

† In charge of correspondence work in Household Economics, Home Study Service, Division of College Extension.

‡ This course may be taken in place of Foods I, with the approval of the Dean of the Division.

FOR GRADUATES AND UNDERGRADUATES

201. PROBLEMS IN CHILD WELFARE. Elective, first semester. Class work, three hours. Three semester credits. Prerequisites: Physiology and Psychology. Professor Kneeland.

A study is made of the needs of the child and of the methods of meeting these needs through the care of the child in the home and through community child-welfare activities. The topics considered include the health problems of mother and child, child mentality and training, play and recreation, child labor, juvenile delinquency, and the special needs of defective and dependent children.

209. HYGIENE AND HOME NURSING. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisites: Human Physiology and Household Microbiology. Associate Professor Reynolds.

This course puts special emphasis on the prevention of disease and on the building up of the highest degree of health as the principal functions of the home nurse. The topics studied include the prevention and treatment of functional disturbances, the methods of controlling and nursing communicable diseases, the application of dietetic and serum therapy, the treatment of injuries and wounds, and the practical care of the sick. There are lectures, discussions, and demonstrations, and reference work and special reports are required.

211. SANITATION AND PUBLIC HEALTH. Senior year, both semesters. Class work, three hours. Three semester credits. Prerequisite: Household Microbiology. Associate Professor Reynolds.

This course deals with the household as a factor in health conservation, emphasis being placed upon the interrelation of home and community health. It includes a study of the influence upon health of the location, ventilation, heating, lighting, and water supply of the house; the sanitary disposal of sewage and other wastes; the sanitary care of the house; housing conditions and their control and improvement; public health activities and the methods and importance of public health administration in relation to the home. Reference work and special reports are required.

221. INSTITUTIONAL MANAGEMENT I. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Human Nutrition.

This course deals with the food problem of institutions and includes the study of marketing, preparation of food, arrangement of menus, and cost of service for different types of institutions.

Laboratory.—Practical experience in the cafeteria of the department and investigations of the food problems of other institutions are included in the laboratory work.

226. INSTITUTIONAL MANAGEMENT II. Elective, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: Institutional Management I.

This course includes a study of the various types of institutions; the qualifications and duties of the manager; the planning, equipping, and general care of buildings and rooms; the organization of work; the management of employees; institutional accounting; and office management.

Laboratory.—Experience is given in the cafeteria of the department, and special problems of other institutions are investigated.

236. MODERN PROBLEMS OF THE HOUSEHOLD. Elective, both semesters. Class work and conferences, two hours. Two semester credits. Prerequisite: Household Management. Prerequisite or parallel: Economics. Professor Kneeland.

A brief survey is made of the economic, social, and administrative problems of the modern household, in order to give the student a fuller

understanding of present home conditions and to show the significance of the special problems chosen for investigation. During the rest of the course each student investigates a special topic, reporting on her work to the class or the instructor. The investigation may consist of library work, field work, or experimentation on a problem of family expenditures, housing, household equipment, housekeeping methods and schedules, community conditions and activities related to the home, the use of time freed from housework, or family relationships.

241. INVESTIGATION IN HOUSEHOLD ECONOMICS. Elective, both semesters. From two to five semester credits, depending on the nature of the problem. Prerequisites: Modern Problems of the Household, and Economics. Consult Instructor. Professor Kneeland and Associate Professor Reynolds.

The work of this course may be a continuation of the investigation started in the preceding course, or the investigation of a new economic, social, or administrative problem of the household. Conferences are held and reports are made at hours arranged by appointment.

246. SPECIAL PROBLEMS IN INSTITUTIONAL ADMINISTRATION. Elective, second semester. From two to five semester credits, depending on the nature of the problem. Prerequisite or parallel: Institutional Management II, Dietetics, and Economics. Consult Instructor.

Special problems in the organization and management of institutions are assigned for individual investigation. Conferences are held and reports are made at hours arranged by appointment.

251. INVESTIGATION IN CHILD WELFARE. Elective, second semester. From two to five semester credits, depending on the nature of the problem. Prerequisite: Problems in Child Welfare. Consult Instructor. Professor Kneeland.

A special problem in some phase of child welfare is assigned for individual investigation. Conferences are held and reports are made at hours arranged by appointment.

Home Economics in the Summer School

In addition to instruction in various branches of home economics available to teachers during the regular College year, the College offers several courses in this subject in the Summer School. Instruction in these courses is intended to present correctly that which may be introduced successfully into graded schools and high schools. Students will be enrolled upon presentation of a teacher's certificate, or of a certified statement showing that two years' high-school work or its equivalent has been completed.

A special circular giving in detail the courses offered in the Summer School may be had by applying to the Vice President of the College. See, also, the article on Summer School in this catalogue.

Special Courses in Home Economics

The Housekeepers' Course, which is completed in fifteen weeks or less and is given each semester, and the one-year curriculum in Lunch-room Management are to be found grouped and described with other special courses in another part of this catalogue. They may be found by reference to the general index in the back of this book.

Division of General Science

JULIUS TERRASS WILLARD, *Dean*

In the class of colleges to which this institution belongs the classical studies of the older type of college are replaced by work in the sciences and in vocational subjects. A sound basis for technical training includes thorough training in mathematics, physical science, and biological science. It is believed also that education should include some preparation for the discharge of one's duties to the state and to the community in which he lives. It should afford him that discipline and culture which alone can give him a grasp of the relations among persons and activities, peoples and events with breadth of view and tolerance of attitude, and hence an influence over his associates and fellow citizens of every station in life.

It is the province of the departments grouped in this division of the College to give this basic, scientific, cultural and disciplinary training. Their work is not only foundational, but it penetrates through all the characteristic vocational courses of the institution, as the structural steel of the modern skyscraper penetrates the entire building and forms a secure framework and support for the more readily visible, and evidently important parts. These departments thus give unity to all of the four-year curricula, although presenting but few curricula that are distinctive of their own work. These, however, by means of electives and options, are susceptible of manifold modification and application.

CURRICULUM IN GENERAL SCIENCE

The curriculum in general science includes fundamental training in English, mathematics, science, history, economics, military science, and physical training required in the several specialized vocational courses now offered by the College and chosen by the great body of our students. Its required subjects constitute the central educational basis of the institution. By means of a number of groups of electives, it gives an opportunity to students to advance themselves still further in these fundamental lines and to give special attention to some, instead of taking the technical subjects characterizing other courses. This opportunity meets the needs of several types of young people, among whom are: (1) Those who have not yet fully decided as to their vocation, but who wish an education that is strong and well balanced in respect to modern science and cultural subjects, as a foundation for further education or as a preparation for sound citizenship and intellectual satisfaction in life. (2) Those who are looking forward to teaching in the high schools of the State. The electives offered allow one to give special attention to mathematics, physical science, biological science, agriculture, home economics, history, economics, English, journalism, music, professional educational subjects, and several other lines. (3) Those who are fitting themselves for research work in the sciences, especially as applied to agriculture, engineering, and other industries.

The elective groups offered in this curriculum are to a considerable extent made up of studies required in one or more of the specialized curricula. They provide also, however, advanced work not included in other curricula. The scientific work in connection with the Agricultural and Engineering Experiment Stations, and several fields of State investigation and service, calls for the operation of unusually well-equipped departments in the sciences, and excellent facilities for practical training in this work are thus afforded.

While the curriculum in general science offers a wide choice of electives, these may not be selected aimlessly, or with the idea of choosing the easiest, or of obtaining credit for miscellaneous subjects taken elsewhere or in other curricula. The studies of the freshman and sophomore years are basic and are required of all, without exception. They insure a broad and adequate foundation for subsequent work in the several lines of electives. The electives are to be chosen in groups, approved by the Faculty or by the Dean of the Division of General Science, and in such manner as to give logical coherence to the curriculum as a whole. The elective portion of the curriculum, as thus made up, consists for the most part of several groups of two or more full studies or their equivalent. It is possible to include some single subjects that may be advantageously taken without others. Special combinations in sewing, cooking, and shop work have been planned to meet the needs of prospective teachers of manual training. Students changing from other curricula to that in general science receive credit for work done in the other curricula in so far as it can be fitted into the general plan of this one.

The curriculum in general science is thus many in one. Such various combinations of groups are possible that it is not practicable to print all of them in extended form. There are, therefore, formally presented here the required subjects of the curriculum in their specified order by years and semesters, together with a considerable number of groups of electives.

CURRICULUM IN INDUSTRIAL JOURNALISM

Knowledge is power only as it comes into the possession of those who can use it; it gives pleasure in direct proportion to the extent of its diffusion. A discovery is of but little value as long as the discoverer is the only one who knows of its existence, and the printed page is by far the most effective means of extending knowledge concerning it. Magazines and newspapers never sleep, nor do they take vacations, and their power to elevate mankind is incalculable. But printed knowledge becomes effective only as it is read, and to be widely read in this day it must stand out from the great mass of other matter and gain the attention and hold the interest of the reader. To do this its points must be sharp and easily seen, and the style must be attractive. On the other hand, if the presentation is not essentially true, the more attractive it is the worse it is, and the greater the harm that follows wide reading of it.

The curriculum in industrial journalism endeavors to give young men and women training which will enable them to write both truthfully and effectively, particularly upon industrial subjects. To such subjects the

modern newspaper and the general magazine are giving constantly more attention, while there are also 500 agricultural publications and a greater number of class and trade publications which are largely or exclusively concerned with matters relating to industrial life. The training given by the College has enabled a goodly number of alumni to do successful work upon these publications.

The aim of the curriculum is to present such subjects as will enable the writer to see his work in proper perspective, to obtain authoritative knowledge of some field of industrial activity, and to write acceptably. The curriculum consequently offers, in the first place, fundamental studies of literary, social, and scientific character. Because of the materials with which journalism deals, it is highly desirable that the student obtain a clear knowledge of the social sciences and be able to read at least one current foreign language. Every student in the course is strongly urged to elect German or French. In the second place, the student is required to elect subjects in agriculture, mechanic arts, applied science, or home economics, depending on the portion of the field of industrial journalism which he desires to enter, it being expected that every student graduated from the curriculum shall have special knowledge of some prominent line of industry. In the third place, the theory and practice of journalism are presented in a series of courses extending throughout the sophomore, junior, and senior years, and opportunity is offered for taking additional electives in journalism simultaneously with the required courses.

The College thus affords preparation for work in a wide and inviting field. Our unprecedented industrial achievements have been made by the application of discoveries in physical and biological science. Much of discovery and much of application are yet to come, and one who can write truthfully and attractively of that which is, and of that which comes, will find ample reward.

CURRICULA IN APPLIED CHEMISTRY

The facilities for instruction in chemistry are ample, and the demand of students for curricula planned especially to give chemical training is such that formulations have been made to meet the needs of those desiring to specialize in agricultural chemistry, biochemistry, or industrial chemistry. By suitable modifications of the curriculum in industrial chemistry the needs of students interested in chemical engineering are met. The instructional facilities of the Department of Chemistry reinforced by opportunities for practical work in connection with the researches of the experiment stations are such as to provide amply for this specialized training.

Curriculum in General Science

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER

| | |
|--------------------------|-----------|
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Chemistry I | |
| Chem. 101 | 5(3-6) |
| Plane Trigonometry* | |
| Math. 101 | 3(3-0) |
| General Botany I | |
| Bot. 101 | 3(1-4, 2) |
| Current History | |
| Hist. 126 | 1(1-0) |
| Library Methods | |
| Lib. Ec. 101 | 1(1-0) |
| Military Science I (Men) | |
| Mil. Tr. 101 | 1(0-4) |
| Physical Education M-I | |
| Phys. Ed. 103 | R(0-2) or |
| Physical Education W-I | |
| Phys. Ed. 151A | 1(0-3) |

SECOND SEMESTER

| | |
|---------------------------|-----------|
| College Rhetoric II | |
| Engl. 104 | 3(3-0) |
| Chemistry II | |
| Chem. 102 | 5(3-6) |
| College Algebra* | |
| Math. 104 | 3(3-0) |
| General Botany II | |
| Bot. 105 | 3(1-4, 2) |
| Current History | |
| Hist. 126 | 1(1-0) |
| Elective † | 2(-) |
| Military Science II (Men) | |
| Mil. Tr. 102 | 1(0-4) |
| Physical Education M-II | |
| Phys. Ed. 104 | R(0-2) or |
| Physical Education W-II | |
| Phys. Ed. 152A | 1(0-3) |

SOPHOMORE

FIRST SEMESTER

| | |
|----------------------------------|-----------|
| English Literature I | |
| Engl. 171 | 4(4-0) |
| English History | |
| Hist. 121 | 3(3-0) |
| General Physics I | |
| Physics 135 | 4(3-3) |
| General Zoölogy I | |
| Zoöl. 101 | 3(2-3) |
| Elective † | 3(-) |
| Military Science III (Men) | |
| Mil. Tr. 103 | 1(0-4) |
| Physical Education M-III (Men) | |
| Phys. Ed. 105 | R(0-2) or |
| Physical Education W-III (Women) | |
| Phys. Ed. 153 | 1(0-3) |

SECOND SEMESTER

| | |
|---------------------------------|-----------|
| English Literature II | |
| Engl. 174 | 4(4-0) |
| Modern Europe | |
| Hist. 223 | 3(3-0) |
| General Physics II | |
| Physics 140 | 4(3-3) |
| General Zoölogy II | |
| Zoöl. 102 | 3(2-3) |
| Elective † | 3(-) |
| Military Science IV (Men) | |
| Mil. Tr. 104 | 1(0-4) |
| Physical Education M-IV (Men) | |
| Phys. Ed. 106 | R(0-2) or |
| Physical Education W-IV (Women) | |
| Phys. Ed. 154 | 1(0-3) |

JUNIOR

FIRST SEMESTER

| | |
|---------------------|--------|
| American Government | |
| Hist. 151 | 3(3-0) |
| Psychology | |
| Educ. 101 | 3(3-0) |
| Extempore Speech I | |
| Pub. Spk. 106 | 2(2-0) |
| Elective † | 8(-) |

SECOND SEMESTER

| | |
|----------------------|--------|
| American History I | |
| Hist. 101 | 3(3-0) |
| Economics | |
| Econ. 101 | 3(3-0) |
| General Microbiology | |
| Bact. 101 | 3(1-6) |
| Elective † | 6(-) |

SENIOR

FIRST SEMESTER

| | |
|------------|---------|
| Elective † | 16(-) |
|------------|---------|

SECOND SEMESTER

| | |
|------------|---------|
| Elective † | 16(-) |
|------------|---------|

* Students who offer but one unit of algebra for admission take a five-credit course in College Algebra, Math. 107, the first semester, postponing trigonometry until the second semester. The additional credits are applied against electives.

† Electives are to be chosen, with the advice and approval of the Dean, in groups of not less than eight semester credits, or in courses which extend fields already entered in the required work.

Groups of Electives and Options for Students in the Division of General Science

In addition to the courses included in the following groups, others will be found described in the exposition of the work of the respective departments. From any group elected a sufficient number of courses to constitute an effective block of knowledge must be taken. At least eight semester credits in any new field are usually required, but a smaller number will be honored if in a field already entered upon.

— 1 —

| FIRST SEMESTER | | SECOND SEMESTER | |
|--------------------------|--------|-----------------------------|--------|
| Advanced Composition I | | Advanced Composition II | |
| Engl. 113 | 2(2-0) | Engl. 116 | 2(2-0) |
| Business English | | Advertising English | |
| Engl. 122 | 3(3-0) | Engl. 125 | 3(3-0) |
| Oral English I | | Oral English II | |
| Engl. 128 | 3(3-0) | Engl. 131 | 3(3-0) |
| Argumentation and Debate | | Methods of Teaching English | |
| Engl. 119 | 3(3-0) | Engl. 134 | 3(3-0) |
| The Short Story | | Community English | |
| Engl. 251 | 3(3-0) | Engl. 254 | 2(2-0) |

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| | | | |
|-------------------------------|--------|------------------------------|--------|
| The English Bible I | | The Shakspearean Drama | |
| Engl. 271 | 3(3-0) | Engl. 274 | 3(3-0) |
| Nineteenth Century Literature | | American Literature | |
| Engl. 277 | 3(3-0) | Engl. 280 | 3(3-0) |
| Current Literature | | The Novel | |
| Engl. 282 | 2(2-0) | Engl. 285 | 2(2-0) |
| English Survey I | | English Survey II | |
| Engl. 288 | 2(2-0) | Engl. 290 | 2(2-0) |
| Browning | | The Arts and Crafts Movement | |
| Engl. 293A | 3(3-0) | Engl. 295 | 2(2-0) |

— 3 —

| | | | |
|---------------------|--------|----------------------|--------|
| German I | | German II | |
| Mod. Lang. 101..... | 3(3-0) | Mod. Lang. 102..... | 3(3-0) |
| Beginning German I | | Beginning German II | |
| Mod. Lang. 103..... | 5(5-0) | Mod. Lang. 104..... | 2(2-0) |
| German Readings | | German Short Stories | |
| Mod. Lang. 111..... | 3(3-0) | Mod. Lang. 201..... | 3(3-0) |
| Scientific German I | | Scientific German II | |
| Mod. Lang. 236..... | 3(3-0) | Mod. Lang. 241..... | 3(3-0) |

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| | | | |
|---------------------|--------|----------------------|--------|
| French I | | French II | |
| Mod. Lang. 151..... | 3(3-0) | Mod. Lang. 152..... | 3(3-0) |
| Beginning French I | | Beginning French II | |
| Mod. Lang. 153..... | 5(5-0) | Mod. Lang. 154..... | 5(5-0) |
| French Readings | | French Short Stories | |
| Mod. Lang. 161..... | 3(3-0) | Mod. Lang. 251..... | 3(3-0) |
| Spanish I | | Spanish II | |
| Mod. Lang. 176..... | 3(3-0) | Mod. Lang. 177..... | 3(3-0) |
| Spanish Readings | | Commercial Spanish | |
| Mod. Lang. 180..... | 3(3-0) | Mod. Lang. 183..... | 3(3-0) |

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| | | | |
|---------------------------|--------|------------------------------------|--------|
| Plane Analytical Geometry | | Calculus | |
| Math. 110 | 4(4-0) | Math. 119 | 3(3-0) |
| Calculus I | | Calculus II | |
| Math. 113 | 5(5-0) | Math. 116 | 3(3-0) |
| Analysis of Statistics | | Institutional Accounting | |
| Math. 125 | 3(3-0) | Math. 131 | 3(3-0) |
| Differential Equations | | Special Methods in the Teaching of | |
| Math. 201 | 3(3-0) | Mathematics | |
| | | Math. 122 | 3(3-0) |

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FIRST SEMESTER

| | |
|------------------------------|-------------------|
| Advanced Inorganic Chemistry | |
| Chem. 207 | 3(3-0) |
| Inorganic Preparations | |
| Chem. 202 .. | 2(0-6) to 4(0-12) |
| Industrial Chemistry I | |
| Chem. 203 | 5(3-6) |

SECOND SEMESTER

| | |
|-----------------------------|--------|
| Industrial Electrochemistry | |
| Chem. 205 | 2(2-0) |
| Physical Chemistry | |
| Chem. 206 | 5(3-6) |
| Industrial Chemistry II | |
| Chem. 204 | 5(3-6) |

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| | |
|---------------------------|---------|
| Organic Chemistry | |
| Chem. 120 | 3(2-3) |
| Organic Chemistry I | |
| Chem. 218 | 4(2-6) |
| Organic Preparations | |
| Chem. 223 | 5(0-15) |
| Qualitative Org. Analysis | |
| Chem. 225 | 2(0-6) |
| Physiological Chemistry I | |
| Chem. 232 | 5(3-6) |
| Pathological Chemistry | |
| Chem. 235 | 2(2-0) |

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| Organic Chemistry HE | |
| Chem. 121 | 5(3-6) |
| Organic Chemistry II | |
| Chem. 219 | 4(2-6) |
| Stereoisomeric and Tautomeric Compounds | |
| Chem. 224 | 2(2-0) |
| Carbocyclic and Heterocyclic Compounds | |
| Chem. 226 | 2(2-0) |
| Physiological Chemistry II | |
| Chem. 233 | 5(3-6) |
| Physiological Chemistry | |
| Chem. 231 | 5(3-6) |

— 8 —

| | |
|-------------------------------|--------|
| Quantitative Analysis I | |
| Chem. 150 | 2(0-6) |
| Quantitative Analysis II | |
| Chem. 250 | 3(1-6) |
| Advanced Qualitative Analysis | |
| Chem. 240 | 3(1-6) |

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|---------------------------|--------|
| Quantitative Analysis I | |
| Chem. 150 | 2(0-6) |
| Quantitative Analysis III | |
| Chem. 251 | 3(1-6) |
| Household Chemistry | |
| Chem. 265 | 3(1-6) |

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| | |
|---------------------|--------|
| Household Physics | |
| Physics 101 | 4(3-3) |
| Photography | |
| Physics 120 | 2(1-3) |
| Molecular Physics | |
| Physics 221 | 4(3-3) |
| Wireless Telegraphy | |
| Physics 130 | 2(1-3) |
| Spectroscopy | |
| Physics 230 | 3(1-6) |

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|--|--------|
| Agricultural Physics | |
| Physics 111 | 3(3-0) |
| Harmonics | |
| Physics 222 | 2(2-0) |
| Physical Measurements | |
| Physics 223 | 3(2-3) |
| Special Methods in the Teaching of Physics | |
| Physics 224 | 3(2-3) |
| Radioactivity and Electron Theory | |
| Physics 233 | 3(3-0) |

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| | |
|----------------------------|--------|
| Agricultural Microbiology | |
| Bact. 106 | 3(1-6) |
| Hygienic Bacteriology | |
| Bact. 206 | 4(2-6) |
| Pathogenic Bacteriology II | |
| Bact. 116 | 4(2-6) |
| Poultry Bacteriology | |
| Bact. 216 | 3(1-6) |

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|--|--------|
| Soil Microbiology | |
| Bact. 201 | 3(1-6) |
| Pathogenic Bacteriology I | |
| Bact. 111 | 4(2-6) |
| Dairy Bacteriology | |
| Bact. 211 | 3(1-6) |
| Water Purification and Sewage Disposal | |
| Bact. 221 | 3(1-6) |

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| | |
|---------------------|-----------|
| Plant Pathology I | |
| Bot. 116 | 3(1-4, 2) |
| Plant Pathology II | |
| Bot. 201 | 3(1-4, 2) |
| Plant Physiology I | |
| Bot. 208 | 3(3-0) |
| Economic Botany | |
| Bot. 219 | 3(1-4, 2) |
| Evolution of Plants | |
| Bot. 222 | 3(3-0) |

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|--|-----------|
| Plant Histology | |
| Bot. 215 | 2(0-6) |
| Ecology | |
| Bot. 228 | 2(2-0) |
| Taxonomic Botany of the Flowering Plants | |
| Bot. 225 | 3(1-4, 2) |
| Field Crops and Vegetable Diseases | |
| Bot. 203 | 2(1-2, 1) |
| Fruit Crop Diseases | |
| Bot. 202 | 2(1-2, 1) |

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| FIRST SEMESTER | | SECOND SEMESTER | |
|-------------------------------|--------|-------------------------------|--------|
| Advanced Invertebrate Zoölogy | | Advanced Vertebrate Zoölogy | |
| Zoöl. 201 | 4(2-6) | Zoöl. 202 | 4(2-6) |
| Taxonomy of Invertebrates | | Taxonomy of Vertebrates | |
| Zoöl. 205 | 3(0-9) | Zoöl. 208 | 3(0-9) |
| Cytology | | Animal Ecology | |
| Zoöl. 214 | 4(2-6) | Zoöl. 211 | 3(1-6) |
| Parasitology | | Economic Zoölogy | |
| Zoöl. 123 | 2(1-3) | Zoöl. 126 | 3(1-6) |
| Embryology | | Advanced Mammalian Embryology | |
| Zoöl. 117 | 3(2-3) | Zoöl. 220 | 4(2-6) |

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| | | | |
|--------------------------------|--------|---------------------|--------|
| Dynamic and Structural Geology | | Historical Geology | |
| Geol. 101 | 2(2-0) | Geol. 201 | 2(2-0) |
| | | Engineering Geology | |
| | | Geol. 102 | 4(2-6) |

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| | | | |
|-----------------------------|--------|-----------------------------|--------|
| General Entomology | | General Economic Entomology | |
| Ent. 101 | 3(2-3) | Ent. 206 | 3(2-3) |
| Insect Morphology I | | Apiculture | |
| Ent. 211 | 3(1-6) | Ent. 111 | 3(2-3) |
| Advanced General Entomology | | Principles of Taxonomy | |
| Ent. 221 | 3(3-0) | Ent. 216 | 1(1-0) |
| Advanced Apiculture | | Taxonomy of Insects I | |
| Ent. 228 | 3(2-3) | Ent. 217 | 2(0-6) |

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| | | | |
|---------------------------------------|--------|---|--------|
| American History II | | American History III | |
| Hist. 202 | 3(3-0) | Hist. 203 | 3(3-0) |
| American Industrial History | | | |
| Hist. 105 | 3(3-0) | Immigration and International Relations | |
| Pan-America | | Hist. 228 | 2(2-0) |
| Hist. 207 | 2(2-0) | Comparative Government | |
| Modern England and the British Empire | | Hist. 252 | 2(2-0) |
| Hist. 226 | 3(3-0) | History of the Home | |
| American Political History | | Hist. 225 | 3(3-0) |
| Hist. 206 | 2(2-0) | | |

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| | | | |
|-----------------|--------|-----------------|--------|
| Business Law I | | Business Law II | |
| Hist. 153 | 1(1-0) | Hist. 154 | 1(1-0) |
| | | Farm Law | |
| | | Hist. 155 | 2(2-0) |

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| | | | |
|-----------------------|--------|---------------------------|--------|
| Economics | | Agricultural Economics | |
| Econ. 101 | 3(3-0) | Ag. Ec. 101 | 3(3-0) |
| Sociology | | Marketing and Coöperation | |
| Econ. 151 | 3(3-0) | Ag. Ec. 201 | 2(2-0) |
| Business Organization | | Money and Banking | |
| Econ. 106 | 1(1-0) | Econ. 116 | 2(2-0) |
| Labor Problems | | Public Finance | |
| Econ. 111 | 2(2-0) | Econ. 213 | 2(2-0) |

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| | | | |
|------------------------------|--------|--------------------------|--------|
| Educational Administration I | | Educational Psychology | |
| Educ. 105 | 3(3-0) | Educ. 109 | 3(3-0) |
| History of Education I | | Educational Sociology I | |
| Educ. 113 | 3(3-0) | Educ. 118 | 3(3-0) |
| Rural Education | | Educational Measurements | |
| Educ. 201 | 3(3-0) | Educ. 211 | 3(3-0) |

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FIRST SEMESTER

| | |
|--------------------------|--------|
| Agricultural Education | |
| Educ. 125 | 2(2-0) |
| Home Economics Education | |
| Educ. 121 | 2(2-0) |
| Industrial Education | |
| Educ. 129 | 2(2-0) |

SECOND SEMESTER

| | |
|---|--------|
| Special Methods in the Teaching of Agriculture | |
| Educ. 136 | 3(3-0) |
| Supervised Observation and Teaching in Agriculture | |
| Educ. 161 | 3(0-9) |
| Special Methods in the Teaching of Home Economics | |
| Educ. 132 | 3(3-0) |
| Supervised Observation and Teaching in Home Economics | |
| Educ. 160 | 3(0-9) |
| Special Methods in the Teaching of Industrial Arts Subjects | |
| Educ. 140 | 3(3-0) |
| Supervised Observation and Teaching in Industrial Arts | |
| Educ. 162 | 3(0-9) |

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| | |
|----------------------------|--------|
| Elementary Journalism | |
| Ind. Jour. 107..... | 2(2-0) |
| Journalism Practice I | |
| Ind. Jour. 110..... | 2(0-6) |
| Industrial Feature Writing | |
| Ind. Jour. 123..... | 2(2-0) |
| Journalism Practice III | |
| Ind. Jour. 127..... | 2(0-6) |

| | |
|------------------------|--------|
| Industrial Writing | |
| Ind. Jour. 113..... | 2(2-0) |
| Journalism Practice II | |
| Ind. Jour. 116..... | 2(0-6) |
| Technical Journalism | |
| Ind. Jour. 130..... | 2(2-0) |
| Journalism Practice IV | |
| Ind. Jour. 133..... | 2(0-6) |

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| | |
|-------------------------|--------|
| Materials of Journalism | |
| Ind. Jour. 213..... | 2(2-0) |
| History of Journalism | |
| Ind. Jour. 219..... | 2(2-0) |

| | |
|---------------------|--------|
| Magazine Features | |
| Ind. Jour. 216..... | 2(-) |
| Journalism Surveys | |
| Ind. Jour. 222..... | 2(0-6) |

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Voice (Music 130)

Two private lessons a week. Two semester credits.

Piano (Music 140)

Two private lessons a week. Two semester credits.

Violin (Music 135)

Two private lessons a week. Two semester credits.

Wind Instruments (Music 145)

Two private lessons a week. Two semester credits.

| | |
|--------------------------|--------|
| Harmony I | |
| Music 101 | 2(2-0) |
| Harmony III | |
| Music 103 | 2(2-0) |
| Counterpoint | |
| Music 107 | 2(2-0) |
| History of Music I | |
| Music 110 | 2(2-0) |
| School Music Methods I | |
| Music 120 | 2(-) |
| School Music Methods III | |
| Music 122 | 2(-) |
| Choral Society | |
| Music 150 | 1(1-0) |
| Orchestra | |
| Music 151 | 1(1-0) |
| College Band | |
| Music 152 | 1(1-0) |

| | |
|-----------------------------------|--------|
| Harmony II | |
| Music 102 | 2(2-0) |
| Harmony IV | |
| Music 104 | 2(2-0) |
| Musical Form and Musical Analysis | |
| Music 109 | 2(2-0) |
| History of Music II | |
| Music 111 | 2(2-0) |
| School Music Methods II | |
| Music 121 | 2(-) |
| School Music Methods IV | |
| Music 123 | 2(-) |
| Choral Society | |
| Music 150 | 1(1-0) |
| Orchestra | |
| Music 151 | 1(1-0) |
| College Band | |
| Music 152 | 1(1-0) |

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FIRST SEMESTER

| | | |
|-----------------------|-------|--------|
| American History I | | |
| Hist. 101 | | 3(3-0) |
| American Government | | |
| Hist. 151 | | 3(3-0) |
| Pan-America | | |
| Hist. 207 | ..... | 2(2-0) |
| English History | | |
| Hist. 121 | ..... | 3(3-0) |
| Economics | | |
| Econ. 101 | ..... | 3(3-0) |
| Business Organization | | |
| Econ. 106 | ..... | 1(1-0) |
| Labor Problems | | |
| Econ. 111 | ..... | 2(2-0) |
| Sociology | | |
| Econ. 151 | ..... | 3(3-0) |

SECOND SEMESTER

| | | |
|----------------------------|-------|--------|
| American History II or III | | |
| Hist. 202 or 203 | ..... | 3(3-0) |
| Modern Europe | | |
| Hist. 223 | ..... | 3(3-0) |
| Agricultural Economics | | |
| Ag. Ec. 101 | ..... | 3(3-0) |
| Money and Banking | | |
| Econ. 116 | ..... | 2(2-0) |
| Public Finance | | |
| Econ. 213 | ..... | 2(2-0) |
| Marketing and Coöperation | | |
| Ag. Ec. 201 | | 2(2-0) |
| Agricultural Land Problems | | |
| Ag. Ec. 216 | | 1(1-0) |

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| | | |
|-------------------|-------|-----------|
| General Botany I | | |
| Bot. 101 | | 3(1-4, 2) |
| Plant Pathology I | | |
| Bot. 116 | | 3(1-4, 2) |
| Economic Botany | | |
| Bot. 219 | ..... | 3(1-4, 2) |
| Farm Forestry | | |
| Hort. 113 | ..... | 4(3-3) |

| | | |
|-------------------|-------|-----------|
| General Botany II | | |
| Bot. 105 | ..... | 3(1-4, 2) |

| | | |
|------------------------------------|-------|--------|
| General Zoölogy I | | |
| Zoöl. 101 | ..... | 3(2-3) |
| Parasitology | | |
| Zoöl. 123 | ..... | 2(1-3) |
| Embryology and Physiology | | |
| Zoöl. 108 | ..... | 5(3-6) |
| Hygienic Bacteriology | | |
| Bact. 206 | ..... | 4(2-6) |
| General Entomology | | |
| Ent. 101 | ..... | 3(2-3) |
| Horticultural Entomology | | |
| Ent. 201 | ..... | 2(2-0) |
| Organic Chemistry | | |
| Chem. 120 | ..... | 3(2-3) |
| Quantitative Analysis I | | |
| Chem. 150 | ..... | 2(0-6) |
| Chemistry of Soils and Fertilizers | | |
| Chem. 252 | ..... | 3(1-6) |
| Chemistry of Crops | | |
| Chem. 253 | ..... | 3(1-6) |
| Human Nutrition | | |
| Food and Nut. 112 | ..... | 3(3-0) |
| Household Physics | | |
| Physics 101 | ..... | 4(3-3) |
| Photography | | |
| Physics 120 | ..... | 2(1-3) |

| | | |
|--|-------|-----------|
| Seed Identification and Weed Control | | |
| Agron. 105 | ..... | 2(1-3) |
| Plant Propagation | | |
| Hort. 101 | ..... | 3(2-2, 1) |
| Gardening | | |
| Hort. 122 | ..... | 3(3-0) |
| Landscape Gardening I | | |
| Hort. 125 | ..... | 4(2-6) |
| General Zoölogy II | | |
| Zoöl. 102 | ..... | 3(2-3) |
| Economic Zoölogy | | |
| Zoöl. 126 | ..... | 3(1-6) |
| General Microbiology | | |
| Bact. 101 | ..... | 3(1-6) |
| Water Purification and Sewage Disposal | | |
| Bact. 221 | ..... | 3(1-6) |
| General Economic Entomology | | |
| Ent. 206 | ..... | 3(2-3) |
| Apiculture | | |
| Ent. 111 | ..... | 3(2-3) |

| | | |
|----------------------|-------|--------|
| Dairy Chemistry | | |
| Chem. 254 | ..... | 3(1-6) |
| Chemistry of Meats | | |
| Chem. 255 | ..... | 3(1-6) |
| Household Chemistry | | |
| Chem. 265 | ..... | 3(1-6) |
| Agricultural Physics | | |
| Physics 111 | | 3(3-0) |
| Wireless Telegraphy | | |
| Physics 130 | | 2(1-3) |

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| | | |
|----------------------|-------|--------|
| Household Physics | | |
| Physics 101 | | 4(2-3) |
| Organic Chemistry HE | | |
| Chem. 121 | | 5(3-6) |
| Foods II | | |
| Food and Nut. 106 | ..... | 5(3-6) |
| Human Nutrition | | |
| Food and Nut. 112 | ..... | 3(3-0) |

| | | |
|------------------------|-------|--------|
| Foods I | | |
| Food and Nut. 101 | | 3(1-6) |
| Household Microbiology | | |
| Bact. 121 | | 5(3-6) |
| Dietetics | | |
| Food and Nut. 201 | | 5(3-6) |

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FIRST SEMESTER

| | |
|------------------------------------|--------|
| Design | |
| Ap. Art 101..... | 3(1-6) |
| Clothing II | |
| Clo. and Text. 111..... | 3(1-6) |
| Interior Decoration and Furnishing | |
| Ap. Art 114..... | 3(1-6) |

SECOND SEMESTER

| | |
|---|--------|
| Clothing I | |
| Clo. and Text. 101..... | 2(1-3) |
| Costume Design | |
| Clo. and Text. 106..... | 2(0-6) |
| Textiles | |
| Clo. and Text. 116..... | 3(2-3) |
| Principles of Art and Their Application | |
| Ap. Art 124..... | 3(3-0) |

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| | |
|---|-----------|
| General Botany I | |
| Bot. 101..... | 3(1-4, 2) |
| Market Grades and Classes of Live Stock | |
| An. Husb. 131..... | 3(1-6) |
| Grain Crop Production | |
| Agron. 101..... | 3(2-2, 1) |
| Elements of Dairying | |
| Dairy Husb. 101..... | 3(2-3) |
| Organic Chemistry | |
| Chem. 120..... | 3(2-3) |
| Plant Pathology I | |
| Bot. 116..... | 3(1-4, 2) |
| Soils | |
| Agron. 131..... | 4(3-3) |
| Quantitative Analysis I | |
| Chem. 150..... | 2(0-6) |

| | |
|-------------------------|-----------|
| General Botany II | |
| Bot. 105..... | 3(1-4, 2) |
| Plant Propagation | |
| Hort. 101..... | 3(2-2, 1) |
| Forage Crop Production | |
| Agron. 102..... | 3(2-2, 1) |
| Dairy Judging | |
| Dairy Husb. 104..... | 1(0-3) |
| Farm Poultry Production | |
| Poult. Husb. 101..... | 2(1-2, 1) |
| Principles of Feeding | |
| An. Husb. 152..... | 3(3-0) |
| Orcharding | |
| Hort. 107..... | 2(1-2, 1) |
| Soil Fertility | |
| Agron. 132..... | 3(2-2, 1) |

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| | |
|---------------------------------------|--------|
| Engineering Drawing | |
| Ap. Mech. 155..... | 2(0-6) |
| Architectural Drawing I | |
| Arch. 108..... | 2(0-6) |
| Working Drawings and Specifications I | |
| Arch. 168..... | 2(0-6) |
| Freehand Drawing I | |
| Arch. 111..... | 2(0-6) |
| Design I | |
| Arch. 142..... | 3(0-9) |
| Domestic Architecture | |
| Arch. 172..... | 2(0-6) |
| Perspective | |
| Arch. 127..... | 2(0-6) |

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|--|--------|
| Descriptive Geometry | |
| Ap. Mech. 158..... | 2(0-6) |
| Architectural Drawing II | |
| Arch. 109..... | 2(0-6) |
| Working Drawings and Specifications II | |
| Arch. 169..... | 2(0-6) |
| Shades and Shadows | |
| Arch. 130..... | 2(0-6) |
| Freehand Drawing II | |
| Arch. 114..... | 2(0-6) |
| Design II | |
| Arch. 144..... | 3(0-9) |

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| | |
|----------------------------------|--------|
| Wood Working for Grammar Grades | |
| Shop 120..... | 2(0-6) |
| Wood Working II for High Schools | |
| Shop 130..... | 2(0-6) |
| Forging I | |
| Shop 150..... | 1(0-3) |
| Forging III | |
| Shop 186..... | 1(0-3) |
| Foundry Practice | |
| Shop 160..... | 1(0-3) |
| Machine Tool Work I | |
| Shop 170..... | 2(0-6) |
| Machine Tool Work III | |
| Shop 193..... | 1(0-3) |
| Farm Motors | |
| Farm Engr. 125, 126.... | 3(2-3) |
| Concrete Construction | |
| Ap. Mech. 140, 145.... | 2(1-3) |
| Mechanical Drawing I | |
| Ap. Mech. 161..... | 2(0-6) |

| | |
|---------------------------------|--------|
| Wood Working I for High Schools | |
| Shop 125..... | 2(0-6) |
| Wood Turning | |
| Shop 135..... | 2(0-6) |
| Forging II | |
| Shop 155..... | 1(0-3) |
| Forging IV | |
| Shop 189..... | 1(0-3) |
| Pattern Making | |
| Shop 145..... | 1(0-3) |
| Machine Tool Work II | |
| Shop 192..... | 2(0-6) |
| Metallurgy | |
| Shop 165..... | 2(2-0) |
| Rural Architecture | |
| Farm Engr. 102..... | 3(0-9) |
| Surveying I | |
| Civ. Engr. 102..... | 2(0-6) |

| FIRST SEMESTER | SECOND SEMESTER |
|-----------------------------|-----------------------------|
| Organic Chemistry | Quantitative Analysis III |
| Chem. 120 3(2-3) | Chem. 251 3(1-6) |
| Quantitative Analysis II | Principles of Milling |
| Chem. 250 3(1-6) | Mill. Ind. 101 1(0-3) |
| Grain Crop Production | Milling Practice I |
| Agron. 101 3(2-2, 1) | Mill. Ind. 109 3(1-6) |
| Grain Marketing | Grain Products |
| Mill. Ind. 102 3(3-0) | Mill. Ind. 103 2(2-0) |
| Wheat and Flour Testing | Experimental Baking A |
| Mill. Ind. 203 4(1-9) | Mill. Ind. 204 2(0-6) |
| | Milling Practice II |
| | Mill. Ind. 110 2(0-6) |

Curriculum in Industrial Journalism

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | SECOND SEMESTER |
|-------------------------------------|-------------------------------------|
| College Rhetoric I | College Rhetoric II |
| Engl. 101 3(3-0) | Engl. 104 3(3-0) |
| Chemistry I | Chemistry II |
| Chem. 101 5(3-6) | Chem. 102 5(3-6) |
| Principles of Typography I | Principles of Typography II |
| Ind. Jour. 101 3(2-3) | Ind. Jour. 104 3(2-3) |
| Library Methods | Current History |
| Lib. Ec. 101 1(1-0) | Hist. 126 1(1-0) |
| Current History | |
| Hist. 126 1(1-0) | Options* 5(-) |
| Options* 3(-) | Industrial Journalism Lecture.... R |
| Industrial Journalism Lecture.... R | Military Science II (Men) |
| Military Science I (Men) | Mil. Tr. 102 1(0-4) |
| Mil. Tr. 101 1(0-4) | Physical Education M-II |
| Physical Education M-I | Phys. Ed. 104 R(0-2) or |
| Phys. Ed. 103 R(0-2) or | Physical Education W-II |
| Physical Education W-I | Phys. Ed. 152A 1(0-3) |
| Phys. Ed. 151A 1(0-3) | |

* The options and electives are chosen with the advice and approval of the Dean. The options are in two general groups, of eighteen semester credits each: (1) social science, and (2) courses related to an industry or applied science. In the tabulated presentation of electives for students in the Division of General Science, on preceding pages, groups may be found that will be accepted as the required option and electives. Group 31 (applied science), group 32 (domestic science), group 33 (domestic art), group 35 (agriculture), group 36 (architecture), or group 37 (manual training), may be chosen in satisfaction of the eighteen hours required related to an industry or applied science. From group 30, eighteen hours are to be chosen in satisfaction of the social science option. The options taken in the freshman year, and a large part of those in the sophomore year, must be those related to an industry or applied science.

The electives are to be chosen in groups of usually not fewer than eight semester credits, unless they are courses which extend fields already entered through the required subjects or the options.

SOPHOMORE

FIRST SEMESTER

| | |
|-----------------------------------|------------------|
| English Literature I | |
| Engl. 171 | 4(4-0) |
| General Zoölogy I | |
| Zoöl. 101 | 3(2-3) <i>or</i> |
| General Botany I | |
| Bot. 101 | 3(1-4, 2) |
| Elementary Journalism | |
| Ind. Jour. 107 | 2(2-0) |
| Journalism Practice I | |
| Ind. Jour. 110 | 2(0-6) |
| Options* | 6(-) |
| Industrial Journalism Lectures... | R |
| Military Science III (Men) | |
| Mil. Tr. 103 | 1(0-4) |
| Physical Education M-III (Men) | |
| Phys. Ed. 105 | R(0-2) <i>or</i> |
| Physical Training W-III (Women) | |
| Phys. Ed. 153 | 1(0-3) |

SECOND SEMESTER

| | |
|-----------------------------------|--|
| English Literature II | |
| Engl. 174 | 4(4-0) |
| General Zoölogy II | |
| Zoöl. 102 | 3(2-3) <i>if</i> <i>General Zoölogy I is chosen</i> <i>the first semester.</i> |
| General Botany II | |
| Bot. 105 | 3(1-4, 2) <i>or</i> |
| General Microbiology | |
| Bact. 101 | 3(1-6) <i>if</i> <i>General Botany I is chosen</i> <i>the first semester.</i> |
| Industrial Writing | |
| Ind. Jour. 113 | 2(2-0) |
| Journalism Practice II | |
| Ind. Jour. 116 | 2(0-6) |
| Options* | 6(-) |
| Industrial Journalism Lectures... | R |
| Mil. Science IV (Men) | |
| Mil. Tr. 104 | 1(0-4) |
| Physical Education M-IV (Men) | |
| Phys. Ed. 106 | R(0-2) <i>or</i> |
| Physical Training W-IV (Women) | |
| Phys. Ed. 154 | 1(0-3) |

JUNIOR

FIRST SEMESTER

| | |
|-----------------------------------|---------|
| Industrial Feature Writing | |
| Ind. Jour. 123 | 2(2-0) |
| Journalism Practice III | |
| Ind. Jour. 127 | 2(0-6) |
| Extempore Speech I | |
| Pub. Spk. 106 | 2(2-0) |
| Options and Electives* | 10(-) |
| Industrial Journalism Lectures... | R |

SECOND SEMESTER

| | |
|-----------------------------------|--------|
| Technical Journalism | |
| Ind. Jour. 130 | 2(2-0) |
| Journalism Practice IV | |
| Ind. Jour. 133 | 2(0-6) |
| Principles of Advertising | |
| Ind. Jour. 125 | 3(3-0) |
| Options and Electives* | 9(-) |
| Industrial Journalism Lectures... | R |

SENIOR

FIRST SEMESTER

| | |
|---------------------------------------|---------|
| Circulation and Advertising Promotion | |
| Ind. Jour. 201 | 3(3-0) |
| Copy Reading | |
| Ind. Jour. 204 | 2(0-6) |
| Electives and Options* | 11(-) |
| Industrial Journalism Lectures... | R |

SECOND SEMESTER

| | |
|-----------------------------------|---------|
| Editorial Practice | |
| Ind. Jour. 207 | 2(2-0) |
| Ethics of Journalism | |
| Ind. Jour. 210 | 2(2-0) |
| Electives and Options* | 11(-) |
| Industrial Journalism Lectures... | R |

* See footnote on the previous page.

Curriculum in Agricultural Chemistry

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | SECOND SEMESTER |
|--------------------------------------|--------------------------------------|
| College Rhetoric I | College Rhetoric II |
| Engl. 101 3(3-0) | Engl. 104 3(3-0) |
| Chemistry I | Chemistry II |
| Chem. 101 5(3-6) | Chem. 102 5(3-6) |
| Plane Trigonometry | College Algebra |
| Math. 101 3(3-0) | Math. 104 3(3-0) |
| General Zoölogy I | General Zoölogy II |
| Zoöl. 101 3(2-3) | Zoöl. 102 3(2-3) |
| Engineering Drawing | General Botany I |
| Ap. Mech. 155 2(0-6) | Bot. 101 3(1-4, 2) |
| Library Methods | |
| Lib. Ec. 101 1(1-0) | |
| Military Science I (Men) | Military Science II (Men) |
| Mil. Tr. 101 1(0-4) | Mil. Tr. 102 1(0-4) |
| Physical Education M-I | Physical Education M-II |
| Phys. Ed. 103 R(0-2) <i>or</i> | Phys. Ed. 104 R(0-2) <i>or</i> |
| Physical Education W-I | Physical Education W-II |
| Phys. Ed. 151A 1(0-3) | Phys. Ed. 152A 1(0-3) |

SOPHOMORE

| FIRST SEMESTER | SECOND SEMESTER |
|--------------------------------------|--------------------------------------|
| Organic Chemistry I | Organic Chemistry II |
| Chem. 218 4(2-6) | Chem. 219 4(2-6) |
| Plane Analytical Geometry | Calculus |
| Math. 110 4(4-0) | Math. 119 3(3-0) |
| Engineering Physics I | Engineering Physics II |
| Physics 145 5(4-3) | Phys. 150 5(4-3) |
| General Botany II | Quantitative Analysis |
| Bot. 105 3(1-4, 2) | Chem. 241 5(1-12) |
| Business Law I | |
| Hist. 153 1(1-0) | |
| Military Science III (Men) | Military Science IV (Men) |
| Mil. Tr. 103 1(0-4) | Mil. Tr. 104 1(0-4) |
| Physical Education M-III (Men) | Physical Education M-IV (Men) |
| Phys. Ed. 105 R(0-2) <i>or</i> | Phys. Ed. 106 R(0-2) <i>or</i> |
| Physical Education W-III (Women) | Physical Education W-IV (Women) |
| Phys. Ed. 153 1(0-3) | Phys. Ed. 154 1(0-3) |

JUNIOR

| FIRST SEMESTER | SECOND SEMESTER |
|-----------------------------|-----------------------------|
| Beginning German I | Beginning German II |
| Mod. Lang. 103 5(5-0) | Mod. Lang. 104 2(2-0) |
| | Scientific German I |
| | Mod. Lang. 236 3(3-0) |
| Physical Chemistry | Inorganic Preparations |
| Chem. 206 5(3-6) | Chem. 202 2(0-6) |
| Agricultural Microbiology | History of Chemistry |
| Bact. 106 3(1-6) | Chem. 208 1(1-0) |
| Soils | Food Analysis |
| Agron. 131 4(3-3) | Chem. 257 3(0-9) |
| | Soil Fertility |
| | Agron. 132 3(2-3) |
| | American Government |
| | Hist. 151 3(3-0) |

SENIOR

FIRST SEMESTER

| | |
|--------------------------------|--------|
| Comparative Physiology I | |
| Anat. 121 | 5(4-3) |
| Chem. of Soils and Fertilizers | |
| Chem. 252 | 3(1-6) |
| Electives | 7(-) |
| Thesis | R |

SECOND SEMESTER

| | |
|--------------------|---------|
| Economics | |
| Econ. 101 | 3(3-0) |
| Chemistry of Crops | |
| Chem. 253 | 3(1-6) |
| Electives | 10(-) |
| Thesis | R |

Curriculum in Biochemistry

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER

| | |
|--------------------------|-----------|
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Chemistry I | |
| Chem. 101 | 5(3-6) |
| Plane Trigonometry | |
| Math. 101 | 3(3-0) |
| General Zoölogy I | |
| Zoöl. 101 | 3(2-3) |
| Engineering Drawing | |
| Ap. Mech. 155 | 2(0-6) |
| Library Methods | |
| Lib. Ec. 101 | 1(1-0) |
| Military Science I (Men) | |
| Mil. Tr. 101 | 1(0-4) |
| Physical Education M-I | |
| Phys. Ed. 103 | R(0-2) or |
| Physical Education W-I | |
| Phys. Ed. 151A | 1(0-3) |

SECOND SEMESTER

| | |
|---------------------------|-----------|
| College Rhetoric II | |
| Engl. 104 | 3(3-0) |
| Chemistry II | |
| Chem. 102 | 5(3-6) |
| College Algebra | |
| Math. 104 | 3(3-0) |
| General Zoölogy II | |
| Zoöl. 102 | 3(2-3) |
| General Botany I | |
| Bot. 101 | 3(1-4, 2) |
| Military Science II (Men) | |
| Mil. Tr. 102 | 1(0-4) |
| Physical Education M-II | |
| Phys. Ed. 104 | R(0-2) or |
| Physical Education W-II | |
| Phys. Ed. 152A | 1(0-3) |

SOPHOMORE

FIRST SEMESTER

| | |
|----------------------------------|-----------|
| Organic Chemistry I | |
| Chem. 218 | 4(2-6) |
| Plane Analytical Geometry | |
| Math. 110 | 4(4-0) |
| Engineering Physics I | |
| Physics 145 | 5(4-3) |
| General Botany II | |
| Bot. 105 | 3(1-4, 2) |
| Business Law I | |
| Hist. 153 | 1(1-0) |
| Military Science III (Men) | |
| Mil. Tr. 103 | 1(0-4) |
| Physical Education M-III (Men) | |
| Phys. Ed. 105 | R(0-2) or |
| Physical Education W-III (Women) | |
| Phys. Ed. 153 | 1(0-3) |

SECOND SEMESTER

| | |
|---------------------------------|-----------|
| Organic Chemistry II | |
| Chem. 219 | 4(2-6) |
| Calculus | |
| Math. 119 | 3(3-0) |
| Engineering Physics II | |
| Physics 150 | 5(4-3) |
| Quantitative Analysis | |
| Chem. 241 | 5(1-12) |
| Military Science IV (Men) | |
| Mil. Tr. 104 | 1(0-4) |
| Physical Education M-IV (Men) | |
| Phys. Ed. 106 | R(0-2) or |
| Physical Education W-IV (Women) | |
| Phys. Ed. 154 | 1(0-3) |

JUNIOR

| FIRST SEMESTER | | SECOND SEMESTER | |
|--------------------------|--------|------------------------|--------|
| Beginning German I | | Beginning German II | |
| Mod. Lang. 103..... | 5(5-0) | Mod. Lang. 104..... | 2(2-0) |
| Physical Chemistry | | Scientific German I | |
| Chem. 206..... | 5(3-6) | Mod. Lang. 236..... | 3(3-0) |
| Histology I | | Inorganic Preparations | |
| Path. 101..... | 3(1-6) | Chem. 202..... | 2(0-6) |
| Comparative Physiology I | | History of Chemistry | |
| Anat. 121..... | 5(4-3) | Chem. 208..... | 1(1-0) |
| | | General Microbiology | |
| | | Bact. 101..... | 3(1-6) |
| | | American Government | |
| | | Hist. 151..... | 3(3-0) |

SENIOR

| FIRST SEMESTER | | SECOND SEMESTER | |
|---------------------------|---------|----------------------------|---------|
| Physiological Chemistry I | | Physiological Chemistry II | |
| Chem. 232..... | 5(3-6) | Chem. 233..... | 5(3-6) |
| Organic Preparations | | Biochemical Preparations | |
| Chem. 223..... | 5(0-15) | Chem. 234..... | 5(0-15) |
| Economics | | Pathogenic Bacteriology I | |
| Econ. 101..... | 3(3-0) | Bact. 111..... | 4(2-6) |
| Elective..... | 3(-) | Elective..... | 3(-) |
| Thesis..... | R | Thesis..... | R |

Curriculum in Industrial Chemistry

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | | SECOND SEMESTER | |
|--------------------------|-----------|---------------------------|-----------|
| College Rhetoric I | | College Rhetoric II | |
| Engl. 101..... | 3(3-0) | Engl. 104..... | 3(3-0) |
| Chemistry I | | Chemistry II | |
| Chem. 101..... | 5(3-6) | Chem. 102..... | 5(3-6) |
| Plane Trigonometry | | College Algebra | |
| Math. 101..... | 3(3-0) | Math. 104..... | 3(3-0) |
| Engineering Drawing | | Descriptive Geometry | |
| Ap. Mech. 155..... | 2(0-6) | Ap. Mech. 158..... | 2(0-6) |
| Library Methods | | Mechanical Drawing I | |
| Lib. Ec. 101..... | 1(1-0) | Ap. Mech. 161..... | 2(0-6) |
| Woodwork | | Business Law I | |
| Shop 101..... | 1(0-3) | Hist. 153..... | 1(1-0) |
| Forging I | | | |
| Shop 150..... | 1(0-3) | | |
| Military Science I (Men) | | Military Science II (Men) | |
| Mil. Tr. 101..... | 1(0-4) | Mil. Tr. 102..... | 1(0-4) |
| Physical Education M-I | | Physical Education M-II | |
| Phys. Ed. 103..... | R(0-2) or | Phys. Ed. 104..... | R(0-2) or |
| Physical Education W-I | | Physical Education W-II | |
| Phys. Ed. 151A..... | 1(0-3) | Phys. Ed. 152A..... | 1(0-3) |

SOPHOMORE

FIRST SEMESTER

| | |
|----------------------------------|-----------|
| Organic Chemistry I | |
| Chem. 218 | 4(2-6) |
| Plane Analytical Geometry | |
| Math. 110 | 4(4-0) |
| Engineering Physics I | |
| Physics 145 | 5(4-3) |
| Adv. Inorg. Chemistry | |
| Chem. 207 | 3(3-0) |
| Military Science III (Men) | |
| Mil. Tr. 103..... | 1(0-4) |
| Physical Education M-III (Men) | |
| Phys. Ed. 105..... | R(0-2) or |
| Physical Education W-III (Women) | |
| Phys. Ed. 153..... | 1(0-3) |

SECOND SEMESTER

| | |
|---------------------------------|-----------|
| Organic Chemistry II | |
| Chem. 219 | 4(2-6) |
| Calculus | |
| Math. 119 | 3(3-0) |
| Engineering Physics II | |
| Physics 150 | 5(4-3) |
| Quantitative Analysis | |
| Chem. 241 | 5(1-12) |
| Military Science IV (Men) | |
| Mil. Tr. 104..... | 1(0-4) |
| Physical Education M-IV (Men) | |
| Phys. Ed. 106..... | R(0-2) or |
| Physical Education W-IV (Women) | |
| Phys. Ed. 154..... | 1(0-3) |

JUNIOR

FIRST SEMESTER

| | |
|---------------------|--------|
| Beginning German I | |
| Mod. Lang. 103..... | 5(5-0) |
| Physical Chemistry | |
| Chem. 206 | 5(3-6) |
| Fire Assaying | |
| Chem. 242 | 2(0-6) |
| Gas Analysis | |
| Chem. 243 | 1(0-3) |
| Elective | 3(-) |

SECOND SEMESTER

| | |
|-----------------------------|-----------|
| Beginning German II | |
| Mod. Lang. 104..... | 2(2-0) |
| Scientific German I | |
| Mod. Lang. 236..... | 3(3-0) |
| Inorganic Preparations | |
| Chem. 202 | 2(0-6) |
| History of Chemistry | |
| Chem. 208 | 1(1-0) |
| Industrial Electrochemistry | |
| Chem. 205 | 2(2-0) |
| Electrical Engineering C | |
| Elect. Engr. 160, 165... | 3(2-2, 1) |
| Elective | 3(-) |

SENIOR

FIRST SEMESTER

| | |
|------------------------|--------|
| American Government | |
| Hist. 151 | 3(3-0) |
| Industrial Chemistry I | |
| Chem. 203 | 5(3-6) |
| Electives | 3(-) |
| Thesis | R |

SECOND SEMESTER

| | |
|-------------------------|--------|
| Economics | |
| Econ. 101 | 3(3-0) |
| Industrial Chemistry II | |
| Chem. 204 | 5(3-6) |
| Electives | 8(-) |
| Thesis | R |

Bacteriology

Professor BUSHNELL
Associate Professor HUNTER
Associate Professor GAINES

Instructor WITHAM
Instructor BEAUDETTE

The Department of Bacteriology occupies parts of the first and second floors of Veterinary Hall. The space is divided into offices and private laboratories, an experiment station and research laboratory, a large general laboratory, incubator or temperature room, washroom, and stock room. The laboratories are well lighted and equipped with gas, lockers, ice chests, sterilizers, wall cases, microscopes, and other modern facilities necessary for bacteriological work.

The instruction consists of lectures, recitations, demonstrations, and laboratory practice. Printed synopses of lectures and printed laboratory directions are furnished the students in some of the courses; in others textbooks are required. The Department library contains textbooks on

bacteriology and allied subjects, also the current files of the important technical periodicals relating to bacteriology. These are at the constant disposal of the students for reference. To those who desire graduate work the Department offers excellent facilities.

Bacteriology is presented to the students as a biological science and as a practical factor in everyday life. In this subject only the simplest forms of life, consisting almost invariably of one-celled organisms, are studied. It is now possible to study these microscopical forms with ease and accuracy, thus paving the way for a more complete study and better understanding of cells in the aggregate. The second point of view from which this subject is approached is that of its practical application in agriculture, medicine, domestic science, and sanitation.

COURSES IN BACTERIOLOGY

FOR UNDERGRADUATES

101. GENERAL MICROBIOLOGY. Sophomore or junior year, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Professor Bushnell and Miss Witham.

This general introductory course consists of lectures, recitations and demonstrations covering the morphological and biological characters, the classification and the distribution of bacteria, factors necessary for the development of bacteria, culture media, cultural features, staining values, and fundamental principles of applied bacteriology.

Laboratory.—The student prepares culture media and becomes familiar with principles of sterilization and incubation, and with general laboratory technic. During the last half of the semester, organisms representing the different families and genera are studied microscopically and culturally. Also preliminary quantitative and qualitative examinations are made of milk, water, soil, etc.

106. AGRICULTURAL MICROBIOLOGY. Junior year, both semesters. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry. Professor Bushnell and Miss Witham.

This is a general course consisting of lectures, recitations and demonstrations. The relation of microorganisms to agriculture is particularly emphasized. First, information is given concerning the nature of microorganisms; their biological characteristics, classification and distribution in nature; their influence upon the plant food in the soil; their relation to certain fermentations, etc. Later some emphasis is placed upon the relation of microorganisms to disease; sources and modes of infection; use of germicidal agents and general hygienic measures.

Laboratory.—In the laboratory, the student becomes familiar with methods of cultivating and studying bacteria, yeasts and molds. Various known forms are studied; methods for the quantitative and qualitative analysis of water, milk, etc., are given some attention. Some time is given to methods of sterilization and the use of germicidal agents. The aim of this course is to give the student a general working knowledge of the subject and to point out its relation to agriculture and the problems of everyday life.

111. PATHOGENIC BACTERIOLOGY I. Sophomore year, second semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: Chemistry II. Professor Bushnell and Doctor Beaudette.

This is primarily a general introductory course, consisting of lectures, demonstrations and recitations covering the distribution, the morphological and biochemical features of microorganisms; factors necessary for

the development and cultivation of bacteria and the fundamental principles of the science as applied to veterinary medicine.

Laboratory.—The student first becomes acquainted with the general laboratory technic, comprising the preparation of media, methods of sterilization, incubation, inoculation, plating, isolating, and staining of bacteria. Different cultures of microorganisms are studied morphologically, culturally and biochemically. A quantitative and qualitative examination of milk and water is made in the latter part of the semester.

116. PATHOGENIC BACTERIOLOGY II. Junior year, first semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: Pathogenic Bacteriology I. Professor Bushnell and Doctor Beaudette.

A study is made of the morphology, powers of resistance, pathogenesis, distribution, channels of infection, and means of dissemination of pathogenic bacteria, especially those related to the specific infectious diseases of animals; epizootic and epidemic diseases of unknown etiology are further treated. A detailed study is made of the manufacture, standardization, preparation for the market and use of vaccines, antitoxins, and other biological products related to the diagnosis, prevention, and treatment of specific infectious diseases; of susceptibility, immunity, and infection; of theories of immunity; of anaphylaxis, opsonins, precipitins, bacteriolysins, and agglutinins.

Laboratory.—A study is made of the microscopical and cultural character of pathogenic microorganisms; of laboratory animal inoculations, autopsy, and diagnosis; prevention and treatment of specific infectious diseases. Experimental production of opsonins, antitoxins, agglutinins, precipitins, and cytolytins; experiments showing the constitutions and mode of action of these antibodies; production of active and passive anaphylaxis, and of anaphylatoxin; methods for the production and standardization of biological products, such as diphtheria and tetanus antitoxin, bacterins, etc.; the application of the various phenomena of immunity in the diagnosis of infectious diseases; the identification of animal and vegetable proteins; complement fixation tests for glanders, opsonic technique, etc., comprise the laboratory work.

121. HOUSEHOLD MICROBIOLOGY. Junior year, both semesters. Lectures, three hours; laboratory, six hours. Five semester credits. Prerequisite: Elementary Organic Chemistry. Professor Bushnell and Miss Witham.

This course consists of lectures, recitations and demonstrations relating to the classification, distribution and the relative importance of bacteria. The morphological and biochemical characters of microorganisms are considered, together with a study of those factors necessary for the proper development of bacteria, and the fundamental principles of the science as applied to household economics. It is designed to give the student a more thorough knowledge of those microorganisms which are of importance in the household. The significance of microbial findings in the analysis of water, milk, and foods, also consideration of the conditions which tend to increase or decrease the bacterial content of food substances, are studied in detail. Some time is given to the principles of sanitation as applied to public-health problems. The class work is a more theoretical consideration of the problems undertaken in the laboratory.

Laboratory.—General laboratory technique is first taken up, consisting of preparation of media, methods and principles of sterilization, incubation, plating, isolating and staining of microorganisms. Studies consisting of the morphological, cultural, and biochemical characteristics of different organisms are made. A study of microorganisms and their activities, both beneficial and harmful, in their relation to household

economy; bacteriological study of water, milk, and foods; the determination of the potability of water; milk contamination, the effect of cooling upon the bacterial content of milk, pasteurization of milk, etc.; microscopical study of yeasts and molds; the spoilage of canned vegetables and fruits; methods of food preservation; the manufacture of vinegar; study of activities of various species of microorganisms, thermal death point, the germicidal action of various disinfectants, etc., are topics taken up in the laboratory work.

FOR GRADUATES AND UNDERGRADUATES

201. SOIL MICROBIOLOGY. Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: Course 101 or 106. Associate Professor Gainey.

This is an introductory course covering the principles of soil microbiology as defined at the present time, and fitting the student for independent research on microbial investigations of soil, including the influence of microbial flora, of depth and character of soil, temperature, moisture, chemical reaction, aëration, and other factors; activities of soil microorganisms, ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation. Various texts are recommended as reference books.

Laboratory.—The laboratory work comprises the preparation of various special culture media and reagents necessary to conduct bacteriological analyses of the soil; qualitative analysis and the laboratory study of ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation; plot experiments and field work illustrating the influence of various factors upon the bacterial flora, and the inoculation of soil with symbiotic nitrogen-fixing bacteria.

206. HYGIENIC BACTERIOLOGY. Elective, first semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: General, Agricultural, or Household Microbiology. Professor Bushnell.

Pathogenic bacteria, especially those related to disease of man; channels of infection, and means of dissemination of pathogenic bacteria; epidemics, their cause and control; isolation, disinfection, and quarantine; prophylaxis against specific infectious diseases and important precautions necessary in the control of communicable diseases are studied. Various books are recommended as textbooks.

Laboratory.—The laboratory work comprises microscopical and cultural study of pathogenic bacteria; technique involved in the diagnosis of *Bacterium tuberculosis* in sputum; the culture of pathogenic anærobic bacteria; the isolation and identification of pathogenic bacteria from animal tissues, from pus and exudates; bacteriological examination of air, water, milk, sewage; interpretation of results, etc.

211. DAIRY BACTERIOLOGY. Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General, Agricultural, or Household Microbiology. Associate Professor Hunter.

Consideration is given to the bacterial flora of milk, butter, and cheese; to infectious diseases conveyed through dairy products; to bacterial contamination of milk by air, water, utensils, etc.; to normal and abnormal fermentations in milk, their significance and control.

Laboratory.—The preparation of culture media necessary for dairy bacteriological work; milk contamination; quantitative and qualitative bacteriological analyses of milk; the microscopical and cultural characters of the types of microorganisms representing the flora of milk, butter, and cheese; types of milk-fermenting organisms; the examination of cream, wash water, and separator slime; the effect of temperature on the growth of milk bacteria; pasteurization of milk; examina-

tion of milk for the presence of *Bacterium tuberculosis*, leucocytes and streptococci are taken up in the laboratory work. Various texts are recommended as reference books.

216. POULTRY BACTERIOLOGY. Elective, first semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General or Agricultural Microbiology. Professor Bushnell.

Consideration is given to the various microbial diseases of poultry; etiology, sources, and modes of infection; prevention and cure; to the microbial content of freshly laid eggs, cold-storage eggs, and egg products, with conditions tending toward increase or decrease of this microbial content.

Laboratory.—Microorganisms pathogenic for poultry; artificial production, diagnosis, and control of poultry diseases; microbial content of eggs and egg preparations produced and handled under various conditions, form the subject matter of the laboratory work.

221. WATER PURIFICATION AND SEWAGE DISPOSAL. Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Microbiology, or Household Microbiology. Professor Bushnell.

The course comprises a study of the bacterial content of natural waters; of factors influencing the bacterial flora of water; of bacterial indicators of pollution; of the collection and transportation of water samples; of methods of water purification and sewage disposal; of the application of water sanitation to rural homes and municipalities.

Laboratory.—The laboratory work consists of quantitative and qualitative examinations, according to standard methods, of samples of water and sewage; methods involved in the enumeration and identification of intestinal bacteria in water; laboratory study of conditions influencing the bacterial content and potability of water. Printed laboratory directions are furnished.

FOR GRADUATES

301. RESEARCH BACTERIOLOGY. Elective, both semesters. Credit to be arranged. Prerequisite: At least two of the outlined courses offered by the department. Professor Bushnell, Associate Professor Hunter, Associate Professor Gainey.

Advanced students showing sufficient training, ability and interest in original research are admitted to this course, upon approval of the head of the department. The student is under the direct supervision of a faculty member of the department, and in consultation with him the subject for investigation is chosen and outlined.

Students showing the proper interest and ability are given an opportunity to do experiment-station and advanced research work, during vacation periods, under the direct supervision of a faculty member of the department.

Students desiring to take work leading to an advanced degree are given individual research problems. After the proper completion of such an investigation, the results are presented to the graduate faculty in the form of a thesis. Such a thesis, when accepted by the faculty, fulfills part of the requirements for a master of science degree.

Botany and Plant Pathology

Professor MELCHERS
Professor MILLER
Assistant Professor DAVIS
Assistant Professor GATES

Instructor HAYMAKER
Instructor DALBEY
Assistant CASHEN
Fellow DALE

The instruction given in the Department of Botany and Plant Pathology has a threefold purpose:

First, general training in botany as an observational science, familiarizing the students with the meaning and relations of the manifold forms of plants and the principles governing their life processes. For those who wish to pursue the subject of botany professionally, opportunities are offered to secure a broad and thorough training in the courses given by the department.

Second, the importance of a scientific knowledge of the laws of plant life being fundamental in agriculture, it is sought in the elementary courses to provide such training as will generally fit the minds of agricultural students to grasp the underlying meaning of familiar field work with crops; such training, moreover, as may be built upon in a carefully graded series of advanced courses.

The third phase of the work of the Department of Botany and Plant Pathology lies in the investigation of those problems in plant life which affect agriculture. Three distinct general lines of work in botany are being conducted in the Experiment Station: Experimental investigations in the cause, prevention, and control of plant diseases; physiological investigations in drouth resistance in forage plants, and investigations and a survey of the Kansas flora.

The equipment for elementary instruction comprises eighty compound and sixty-four simple microscopes; a series of Jung, Peter, Kony, and Frank botanical charts; a lantern-slide projection apparatus; and a very complete collection of preserved material for studies in general morphology and plant pathology. For advanced work, Zeiss, Spencer, and Bausch and Lomb microscopes, with apochromatic lenses; a filar micrometer; Bausch and Lomb and Spencer camera lucidas; two Zeiss binocular microscopes; and Bausch and Lomb simple microscopes of the highest grade, provided with special camera lucida attachment, are furnished for the use of the members of the staff, and graduate students. A Minot precision microtome, two Spencer microtomes, electric and gas embedding and sterilizing ovens, and the usual supplies of reagents and glassware, are provided for histological studies.

For instruction in physiology a complete equipment of the Ganong and the Cambridge lines of physiological apparatus and supplies is available.

For investigations in plant pathology and plant physiology in the Experiment Station, a large laboratory is equipped with apparatus for studying normal and abnormal conditions in plants. The apparatus used for making determinations of fungus and bacterial diseases of plants, and for the study of the life histories of pathogenic organisms, consists in part as follows: three compound microscopes, a Bausch and Lomb binocular monobjective compound microscope, a Spencer binocular microscope, analytical balances, drying ovens, hot-air sterilizers, steam auto-

clave, steam still, a Freas electric incubator, transfer chambers for isolating organisms, a Thelco low-temperature incubator, five Chicago electric incubators, pathological tables, research desks, a large supply of glassware for culturing fungi, two soil and air thermographs, a very complete herbarium, containing the various genera and species of fungi, and a large and representative collection of preserved specimens, illustrating the economic plant diseases.

For general botanical reference there is an excellent herbarium, especially complete for the State of Kansas. A very good botanical library is available, containing the usual standard texts and reference works, and files of the principal foreign journals.

COURSES IN BOTANY

FOR UNDERGRADUATES

101. GENERAL BOTANY I. Freshman year, both semesters. Class work, one hour; laboratory, six hours.* Three semester credits. Professor Miller, Assistant Professor Davis, Assistant Professor Gates, Mr. Haymaker, Miss Dalbey, and Miss Cashen.

This is a course of lectures, combined with special study of a required text, with reference reading. The principal life functions of plants, response of plants, such as photosynthesis, digestion, respiration, transpiration, and growth, and the responses of plants to environmental conditions and physical stimuli, are studied. The anatomy of the plant, in so far as it relates to the functions concerned, is studied in some detail. In this course the student gains a general introductory knowledge of the functions and reactions of plants, and learns to regard them from the dynamic standpoint as working organisms. Text, *A Textbook of Botany for Colleges*, by Ganong.

Laboratory—A series of typical experiments is followed out in the laboratory and in the greenhouse. Each student is furnished with a set of the necessary apparatus, and learns to apply quantitative methods to the study of functions. Laboratory outlines are furnished by the department.

105. GENERAL BOTANY II. Freshman year, both semesters. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: General Botany I. Professor Melchers, Professor Miller, Assistant Professor Davis, Assistant Professor Gates, Mr. Haymaker, Miss Dalbey, and Miss Cashen.

A careful study is made of the morphology of the chief great groups of plants, of their physiology and ecology, of the classification and geographic distribution of the plant kingdom, and its economic relation to man. The latter part of the course is devoted to a systematic study of some of the more important plant families in which their floral structures are considered. Some time is given to the tracing out of unknown plants by means of a key.

Laboratory—The aim of the laboratory in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity, and of their probable relations to one another as parts of an evolutionary series. Laboratory outlines are furnished by the department. Text, *A Textbook of Botany for Colleges*, by Ganong.

111. BOTANY. Elective, second semester. Class work, one hour; laboratory, six hours.** Three semester credits. Miss Dalbey.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

** Two of the required laboratory hours are used for report writing outside of the regular laboratory period

This is a condensed course in general botany offered especially for students in the Division of Home Economics. In so far as the time allows, a study is made of the morphology of a few of the chief great groups of plants, of their elementary physiology and their anatomical structures, particularly with reference to the functioning of plant life. The latter portion of the course is devoted to a systematic study of the most important plant families, in which their floral structures are considered. Time is devoted to the tracing out of unknown wild flowers by means of a key, so that a student will be able to familiarize herself with the flora of any community where she may be. This course is designed to afford a sufficient foundation for teaching botany in a high school.

116. PLANT PATHOLOGY I. Sophomore year, first semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: General Botany II. Professor Melchers and Mr. Haymaker.

The diseases affecting the chief economic crops of field, orchard, and garden are studied in considerable detail. The etiology of the various diseases and their most evident symptoms are considered. The student learns to recognize at sight the principal plant diseases he is likely to encounter on the farm, in the nursery, and in market-garden work. Non-parasitic and bacterial diseases are considered to some extent, but the time is devoted chiefly to the more important diseases caused by the fungi, the life histories of which are studied in some detail. Preventive measures are considered in each case. An extensive collection of preserved pathological material is available.

Laboratory.—Practical work in the recognition of all the more common plant diseases of the farm, orchard, and garden is accompanied by detailed microscopic studies of diseased tissues and identification of the fungous pathogenes which cause them. Complete laboratory outlines, which likewise serve as a text in this course, are furnished by the department.

121. PATHOLOGY OF VEGETABLE FOOD PRODUCTS. Elective, first semester. Class work, one hour; laboratory, six hours.** Three semester credits. Prerequisite: High-school Botany, or its equivalent. Miss Dalbey.

This course is designed primarily for students in the Divisions of Home Economics and General Science. It deals with fungous and bacterial diseases and other maladies commonly recognized as the cause of decay or other deterioration in plant products, particularly in fruits and vegetables. The course offers opportunity to acquire the ability to recognize at sight the presence of fungi in fruits and vegetables as they occur on the market. The course aims to place emphasis on the presence of such infection and the results that can be expected when such products are bought on the market and stored under ordinary conditions.

Laboratory—The laboratory work comprises a study of the organisms causing decay in plant food products. Attention is given to conditions affecting the growth and dissemination of the organism, especially temperature and light conditions, and points out the precautions which must be taken to prevent loss of food products through decay. Exercises are devoted to the proper way to select, buy, and store vegetables and fruit as they occur on the market. A study of these is made in the laboratory, since much of the laboratory material is obtained from the local market. In addition to this, an extensive collection of preserved material is available. Laboratory outlines are furnished by the department.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

** Two of the required laboratory hours are used for report writing outside of the regular laboratory period.

126. MEDICAL BOTANY Sophomore year, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: High-school Botany or its equivalent. Assistant Professor Gates.

This is a lecture, laboratory, and reading course dealing with poisonous plants. The lecture includes a study of the principal stock-poisoning plants of the range; losses due to native poisonous plants, methods of identification, habitat, poisonous properties and methods of control and elimination.

Laboratory.—The laboratory work follows the work presented in the lectures, and consists chiefly of a study of the native poisonous plants of the West, the identification of these plants by means of a descriptive key.

FOR GRADUATES AND UNDERGRADUATES

201. PLANT PATHOLOGY II. Elective, first semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: Plant Pathology I. Professor Melchers.

The class work consists primarily of a series of lectures pertaining to mycology, considering the subject from the evolutionary standpoint. The classification of fungi causing plant diseases receives considerable attention, and the relationship of the fungi to one another is emphasized. This course is designed to train those who wish to become more familiar with the classification of the fungi and their morphology; it is essential for those who wish to follow plant pathological work professionally.

Laboratory.—The laboratory work consists of a detailed study of the genera of fungi. A large supply of plant-disease material in the department collections furnishes a basis for these studies.

202. FRUIT CROP DISEASES. Elective, first semester. Class work, one hour; laboratory, three hours.† Two semester credits. Prerequisite: Plant Pathology I. Mr. Haymaker.

The class work consists of a series of lectures dealing with diseases affecting fruit crops of all kinds. Special emphasis is laid on measures and methods for controlling these diseases by means of spraying, sanitation, and varietal resistance. The preparation and practical application of the standard sprays is considered. Text: *Manual of Fruit Diseases*, by Hesler and Whetzel.

Laboratory.—This consists of a detailed study of each disease affecting the major fruit crops, together with a detailed microscopic study of the organisms causing the disease. The course is especially valuable for those studying horticulture or those expecting to specialize in plant pathology. •

203. FIELD CROP AND VEGETABLE DISEASES. Elective, second semester. Class work, one hour; laboratory, three hours.‡ Two semester credits. Prerequisite: Plant Pathology I. Professor Melchers.

This class work consists of a series of lectures dealing with the historical development of phytopathology, with special emphasis on literature pertaining to field-crop and vegetable diseases. The field symptoms are discussed, varietal susceptibility and resistance are considered, and control measures are advised.

Laboratory.—This consists of a detailed microscopic study of the plant diseases attacking field crops and vegetables, and is of value to those who wish to pursue agronomic or horticultural work, and is especially designed for those students who expect to specialize in plant pathology.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

† One of the required laboratory hours is employed in lecture and laboratory quizzes and reviews.

208. PLANT PHYSIOLOGY I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: General Botany II. Professor Miller.

This course consists of a series of lectures on the more important phases of plant physiology. Such subjects as the root systems of plants, absorption, wilting coefficient, resistance to drought, transpiration, water requirement, photosynthesis, respiration, digestion, and growth are discussed in detail. The subject matter of plant physiology that pertains to agriculture is especially emphasized. The course is designed to give students a broad knowledge of the functions of plants and the more important factors which influence them. The work is supplemented by discussions, reference readings, and special reports.

215. PLANT HISTOLOGY. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: General Botany II. Miss Dalbey.

This course is planned to provide a thorough training in the principles and practice of microtechnical methods in botany, including the killing, fixing, and embedding of plant material, microtome work, and the staining and mounting, by various methods, of a tolerably complete and characteristic series of permanent slides, representing the vegetative and reproductive tissues of typical plants, taken from all the principal groups. Text: Chamberlain's *Plant Histology*.

219. ECONOMIC BOTANY. Elective, first semester. Class work, two hours. Two semester credits. Prerequisites: General Botany II and Plant Pathology I.

This course consists of a series of carefully planned lectures by the various members of the department. It treats of the more important phases of botany, such as plant pathology, plant physiology, plant ecology, taxonomy, psychology, morphology, and genetics.

222. EVOLUTION OF PLANTS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: General Botany II. Mr. Haymaker.

Careful consideration is given to the lines along which evolution has proceeded in the plant kingdom, to the relationship of the more important phylla, and to the probable derivation of the chief groups of plants. Instruction is imparted by means of lectures and reference readings. Text: *Evolution of Plants*, by Campbell.

225. TAXONOMIC BOTANY OF THE FLOWERING PLANTS. Elective, first or second semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: General Botany II. Assistant Professor Gates.

The class work consists of a series of lectures dealing with the terms employed, the development of the more important systems of classification, and a consideration of families of plants.

Laboratory.—Selected flower types representing the principal orders and families of plants are studied and plants are identified in the field and in the laboratory.

228. ECOLOGY. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: General Botany II. Assistant Professor Gates.

The class work consists of a series of lectures dealing with the structure and dynamics of vegetation.

Laboratory.—With the opening of vegetation in the spring, field trips are taken to selected places.

*Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

230. **PHYSIOLOGICAL PHENOMENA IN THE GERMINATION OF SEEDS.** Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: General Botany II. Assistant Professor Davis.

This is a course in plant physiology in which the seed is used as the basis of the work in the laboratory. A study is made of the different factors in germination, as to water requirement, temperature, oxygen supply, light, permeability of seed coats by water, solutes, and gases; dormancy, agencies in so-called after-ripening, enzymes, etc. This course is of special interest to students in agronomy, or those who expect to take up work in connection with grain mills, seedhouses, etc.

FOR GRADUATES

301. **PLANT PATHOLOGY III.** Elective, second semester. Laboratory, nine hours.* Three semester credits. Prerequisite: Plant Pathology II. Professor Melchers.

This course is a continuation of Plant Pathology II. Its purpose is to give the advanced student an opportunity for making a closer and more extended study of the pathogenic organisms which cause plant disease. The course includes a somewhat detailed study of the cryptogamic herbarium. Considerable attention is devoted to the growing of pure cultures of pathogenic fungi, the making of inoculations, isolations of fungi, etc. The preparation of media of various kinds for the growing of fungi receives considerable attention. The course is especially designed for those who intend to pursue plant pathology as investigators in experiment stations.

302. **PLANT PATHOLOGY IV.** Elective, first and second semesters. Laboratory, nine hours.* Three semester credits. Prerequisite: Plant Pathology III. Professor Melchers.

This course involves original research. Problems are chosen by the student along some lines in which he is interested. A carefully worked-out report which summarizes the investigation undertaken, is required at the end of the semester.

308. **INVESTIGATIONS IN TAXONOMY AND ECOLOGY.** Elective, first and second semesters. Laboratory work, including conferences and field work, from six to twenty-four hours. From two to eight semester credits. Assistant Professor Gates.

Open to graduate students and especially qualified undergraduates upon approval of application. This course involves original research in a problem, chosen by or assigned to the student. The results are embodied in a written report presented at the end of the course.

*Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

Chemistry

Professor KING
Associate Professor SWANSON
Associate Professor NEWMAN
Associate Professor HUGHES
Associate Professor BRUBAKER
Assistant Professor COLVER
Instructor WEST

Instructor HARRISS
Instructor KEITH
Instructor DOW
Instructor McDONALD
Instructor SPICER
Instructor SKOURUP

All of the industries are becoming more and more dependent for their highest success upon intelligent application of the sciences, and the social sciences are making their greatest progress by tracing their phenomena back to the physical and chemical changes that accompany them. A study of chemistry and physics is therefore essential to any understanding of the processes of nature or of human industry. In the instruction in chemistry the aim is to insist upon a mastery of the chief concepts of the pure science through the agency of textbook drill, accompanied by demonstrations in the lecture room, and experimental observation by the student himself in the laboratory. As the course proceeds, illustrations of chemical principles are drawn from the industrial processes of the chemical, agricultural, domestic, and other arts, thus impressing upon the mind the practical nature of the study. The ultimate object of instruction in this science is to develop in the student the power to form independent judgments upon the manifold problems of daily life in which chemistry plays a part.

The lecture rooms are amply equipped for experiments and demonstrations, and the laboratories are designed to accommodate 936 students each semester in freshman work and qualitative analysis. The laboratories for more advanced work provide space for 324 students, and are well supplied with general and special facilities. The State work in foods, feeding stuffs, and fertilizers, and the chemical investigations of the Experiment Station in soils, crops, animal nutrition, etc., afford unusually good opportunities for students to obtain experience in practical chemistry. In all of the laboratory work the student is required to give the designated amount of time, and at least a certain amount of work must be satisfactorily performed in order to obtain credit.

COURSES IN CHEMISTRY

FOR UNDERGRADUATES

101. CHEMISTRY I. Freshman year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: High-school physics. Professor King, Associate Professor Newman, Mr. West, Miss Harriss, Mr. Keith, Miss Dow, Mr. McDonald, and Mr. Skourup.

This work begins the study of general chemistry, and is designed, with that of the succeeding semesters, to give the student a knowledge of the fundamental principles of chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions, the principles of nomenclature, the significance of formulas, chemical equations, etc., much attention is given to these, while at the same time the practical uses of the substances, and the processes used in metallurgy, engineering, agriculture, and other arts are emphasized. Mc-

Pherson and Henderson's *A Course in General Chemistry* is used as a textbook, this semester's work covering the first 331 pages. The text is supplemented by lectures and is amply illustrated by experimental demonstrations.

Laboratory.—As far as time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required, as far as possible, to study experiments in that light. In this, as in all other laboratory work in chemistry, the objects are to illustrate chemical phenomena, and to teach care in manipulation, attentive observation, logical deduction, and discrimination and accuracy in recording results and conclusions. The student is required to give the designated amount of time, and a minimum amount of work must be satisfactorily performed in order to obtain credit. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

102. CHEMISTRY II. Freshman year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry I. Teachers same as for Chemistry I.

The work in this course for the first half of the semester is a completion of the study of general chemistry begun the preceding semester. The second half of the semester is devoted to the study of the general principles of qualitative analysis as outlined in an *Elementary Treatise on Qualitative Analysis*, by William McPherson.

Laboratory.—In the laboratory the student studies the ordinary methods of separation and detection of the more common metals, non-metals, acids, bases, and salts. The teaching of analysis as such is a secondary object, although the student is held to the exact observation and careful reasoning required in ascertaining the composition of single substances and mixtures. The effect of the course is to broaden, strengthen, and unify the student's ideas of general chemistry.

105. CHEMISTRY AV-I. Freshman year, first semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Mr. McDonald.

This course deals with the fundamental laws and theories of chemistry, the elements and their inorganic compounds, and lays emphasis on the application of chemistry to the arts and industries. Both the metals and nonmetals are studied, but the treatment is less detailed than in Chemistry I and II.

Laboratory.—The laboratory work is intended to give the student training in manipulation and first-hand knowledge of the important laws of chemistry and the properties of substances studied, by use of appropriate experiments which the student himself performs.

106. CHEMISTRY V-II. Freshman year, second semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry AV-I. Mr. West.

This course follows Chemistry AV-I and has the same general object, but deals with the organic compounds.

Laboratory.—The laboratory work consists in the preparation of certain organic compounds and qualitative study of their properties.

107 and 108. CHEMISTRY E-I and E-II. Freshman year, both semesters. Lectures and recitations, three hours; laboratory, three hours. Four semester credits each. Prerequisites and teachers same as for Chemistry I and II.

These courses cover the work of general chemistry and qualitative analysis. The relative amount of time spent upon these subjects is the

same as in Chemistry I and II with the exception of the laboratory. Instead of spending six hours a week in laboratory, students in these courses spend three hours. Throughout all the work in these courses emphasis is placed upon those phases of chemistry which have a special bearing upon engineering materials. Texts: Same as for Chemistry I and II.

120. ORGANIC CHEMISTRY. Sophomore year, both semesters and summer school. Lectures and recitations, two hours; laboratory, three hours. Three semester credits. Prerequisite: A college course in general chemistry. Associate Professor Brubaker, Assistant Professor Colver, and Mr. West.

A systematic study is made of the simpler examples of the more important classes of organic compounds in their logical chemical relations. Such substances as touch the everyday affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soaps, sugars, starch, proteins, and other less-known substances. Compounds used for clothing, fuel, light, antiseptics, disinfectants, anæsthetics, poisons, medicines, solvents, etc., are included. While especial attention is given to the useful organic compounds, the study of others is not excluded, when they contribute to an understanding of the systematic relations existing among the several groups. Any serious study of the biological sciences, or of the arts connected with them, must require this as a foundation, and a knowledge of the properties of organic compounds finds frequent application in engineering as well. The subject is amply illustrated by experiments in the lecture room. Text: Norris's *Organic Chemistry*, in part, accompanied by lectures amplifying certain parts of the subject.

Laboratory.—The laboratory work includes experiments and preparations touching the more important compounds studied in the lectures and recitations, especially fats, carbohydrates and proteins.

121. ORGANIC CHEMISTRY HE. Sophomore year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisites and teachers same as for Organic Chemistry.

The lectures and recitations in this course are the same as in Organic Chemistry, with additional emphasis placed on the organic compounds most intimately related to daily life in the home. Text: Norris's *Organic Chemistry*, in part, accompanied by lectures amplifying certain parts of the subject.

Laboratory—The laboratory work includes preparations, and qualitative and quantitative experiments touching the more important compounds studied in the lectures and recitations. Especial emphasis is placed on the organic compounds found in fuels, foods, fabrics, disinfectants, and other materials used in and about the home. Laboratory guide: *Experiments in Descriptive Organic Chemistry*, by Alice F. Blood.

150. QUANTITATIVE ANALYSIS I. Sophomore year, both semesters. Laboratory, six hours. Two semester credits. Prerequisites: Chemistry I and II. Associate Professor Brubaker.

This course is planned to give the student a knowledge of the simpler operations in gravimetric analysis and volumetric analysis and to lay the foundation for studies in which such knowledge is required. Particular emphasis is laid on the importance of exact quantitative work and its value in investigations connected with agriculture. Textbook: *Notes on Quantitative Chemical Analysis*, by C. W. Folk.

FOR GRADUATES AND UNDERGRADUATES.

202. INORGANIC PREPARATIONS. Junior year and elective, both semesters. One semester credit for each three hours of laboratory work. Prerequisite: Chemistry II or Chemistry HE-II. Professor King.

Students of Advanced Inorganic Chemistry are advised to take this course. It consists in the preparation and purification of some typical inorganic compound, together with those of more complex composition and compounds of the rarer elements.

203 and 204. INDUSTRIAL CHEMISTRY I AND II. Senior year and elective, first and second semesters, respectively. Given in 1919-'20 and alternate years thereafter. Class work, three hours; laboratory, six hours. Five semester credits each semester. Prerequisite: Organic Chemistry. Professor King and Associate Professor Brubaker.

This course treats the more important technical processes. Considerable attention is given to general operations and the machinery employed. The more important commercial manufacturing industries are then taken up, including, with others, the production of alkalies, acids, glass, clay products, cement, paint, pigments, oils, varnish, soap, gas, paper, leather, petroleum, sugars, starch and the products of fermentation and the destructive distillation of wood and coal. Textbook: *Manual of Industrial Chemistry*, by Rogers and Aubert.

205. INDUSTRIAL ELECTROCHEMISTRY. Junior year and elective, second semester. Offered in 1920-'21 and alternate years thereafter. Class work, two hours. Two semester credits. Prerequisite: College courses in general chemistry and physics. Associate Professor Brubaker.

In this course are treated briefly the principles of voltameters, electrochemical methods of analysis, electroplating, electrotyping, and the production of metallic objects by electroplating methods. This is followed by fuller treatment of electrolytic refining of metals, the manufacture of various industrial products by electrolytic methods, primary cells, the lead storage battery, the Edison storage battery, the electrometallurgy of iron and steel, and the fixation of atmospheric nitrogen. Textbook: Thompson's *Applied Electrochemistry*.

206. PHYSICAL CHEMISTRY. Junior year, first semester. Given in 1920-'21 and alternate years thereafter. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry II or Chemistry HE-II. Professor King.

This course is especially adapted to meet the needs of students intending to specialize in soils, as well as those students who desire a broader knowledge of the more fundamental laws of chemistry. In this course emphasis is placed upon the study of gas laws, osmotic pressure, surface tension, solution, colloidal solutions, thermochemistry, equilibria, and electrical conductors.

Laboratory.—In the laboratory the subject matter discussed in the lectures is investigated experimentally.

207. ADVANCED INORGANIC CHEMISTRY. Sophomore year and elective, first semester. Class work, three hours. Three semester credits. Given in 1920-'21 and alternate years thereafter. Prerequisite: Chemistry II or Chemistry HE-II. Associate Professor Newman.

The course consists of a thorough study of the facts of chemistry and their theoretical interpretations according to the views of the present day. Special stress is placed upon the properties of the elements as a basis for methods of classification, and upon the rarer elements and compounds. Text: *Modern Inorganic Chemistry*, by J. W. Mellor.

208. HISTORY OF CHEMISTRY. Junior year, second semester. Lecture work, one hour. One semester credit. Prerequisite: Physical Chemistry. Dean Willard.

These lectures deal with the history concerning the development of the principal laws and theories of chemistry, special emphasis being placed upon the failures and triumphs of the founders of chemical science.

209. SURFACE TENSION AND RELATED PHENOMENA. Elective and graduate, second semester. Lectures, two hours. Two semester credits. Prerequisite: Physical Chemistry (Chem. 206). Professor King.

This course of lectures deals with surface tension phenomena. Attention is devoted to methods of measuring surface tension, to surface energetics, and particularly to the relation of surface tension to absorption, and colloidal formation.

210. CHEMICAL STATICS AND DYNAMICS. Elective and graduate, second semester. Lectures and assigned reading, two hours. Two semester credits. Prerequisite: An approved course in Physical Chemistry. Professor King.

This course of lectures deals with the general topics of chemical equilibria, velocity of chemical reactions, hydrolysis, catalysis, etc.

211. PAINT, OILS AND PIGMENTS. Elective and graduate, first semester. Lectures and assigned readings, two hours. Two semester credits. Prerequisite: Satisfactory courses in Organic Chemistry and Quantitative Analysis. Professor King.

This course consists of a series of lectures and assigned readings on the extraction, purification, and properties of the oils commonly used in paints, on the manufacture and properties of paint pigments, and on a general survey of the products employed as protective coverings for both wood and metal.

218 and 219. ORGANIC CHEMISTRY I AND II. Sophomore year, first and second semesters, respectively. Lectures and recitations, two hours; laboratory, six hours. Four semester credits each. Prerequisite: Chemistry II. Assistant Professor Colver and Mr. West.

This course includes a careful, systematic study of aliphatic and aromatic compounds to such an extent as time permits. Text: Perkin and Kipping's *Organic Chemistry*.

Laboratory.—The laboratory work includes preparation and purification of a number of compounds selected from the aliphatic and aromatic series for the illustration of important synthetic reactions. In addition to the verification of the constants of these compounds the important qualitative tests are made which are characteristic of the classes of compounds. Laboratory guide: Jones's *A Laboratory Outline of Organic Chemistry*.

223. ORGANIC PREPARATIONS. Senior year, first semester. Laboratory work, fifteen hours. Five semester credits. Prerequisite: Organic Chemistry II. Assistant Professor Colver.

The compounds prepared in this course are so chosen as to give the student a thorough knowledge of the fundamental principles of synthetic organic chemistry.

224. QUALITATIVE ORGANIC ANALYSIS. Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: Organic Chemistry II. Assistant Professor Colver.

This is primarily a laboratory course designed to impress upon the student's mind the characteristic reactions of the various classes of organic compounds. The first few weeks are spent in carrying out class reactions, using known compounds; the remainder of the semester is devoted to the classification and identification of pure, unknown substances and mixtures. Manual: *Class Reactions and Identification of Organic Substances*, by Noyes and Mulliken; reference book, *A Handbook of Organic Analysis*, by H. T. Clarke.

225. STEREOISOMERIC AND TAUTOMERIC COMPOUNDS. For graduate and advanced students in chemistry, second semester. Lectures, two hours. Two semester credits. Prerequisite: Organic Chemistry II. Assistant Professor Colver.

The course consists of lectures and assigned readings upon such special topics of organic chemistry as optical isomerism, particularly the older and more recent methods of determining the configuration of the asymmetric carbon atoms of sugars; geometrical isomerism; and keto-enol tautomerism.

226. CARBOCYCLIC AND HETEROCYCLIC COMPOUNDS. For graduate and advanced students in chemistry, second semester. Lectures, two hours. Two semester credits. Prerequisite: Organic Chemistry II. Assistant Professor Colver.

The course consists of lectures and assigned readings upon carbocyclic and heterocyclic compounds. In the study of the carbocyclic compounds the structure, orientation, methods of synthesis, and reactions of benzene, naphthalene, anthracene, and derivatives are considered in much greater detail than is possible in an elementary course. The heterocyclic compounds studied include furane, pyrrol thiophene, pyridine, quinoline, isoquinoline, purine, pyrimidine, hydantoin, and some structurally related substances, such as certain classes of dyes, the alkaloids, and uric acid.

230. PRINCIPLES OF ANIMAL NUTRITION. Elective and graduate, second semester. Class work, three hours. Three semester credits. Prerequisite: Organic Chemistry. Associate Professor Hughes.

This course gives a thorough study of the relations of animals to matter and energy, and the physiological principles involved. Study of the researches which have established the principles of nutrition constitutes the ground work of the course.

231. PHYSIOLOGICAL CHEMISTRY. Elective and graduate, second semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: An acceptable course in organic chemistry. Associate Professor Hughes.

This course is designed to meet the needs of students who expect to specialize in nutrition or in one of the biological sciences. It is a systematic study of the synthetic and analytical chemical changes that accompany the physiological processes of animals and plants. The chemical properties of food and body substances, and their general specific functions; the changes that take place in digestion, assimilation and elimination, and the means by which these are brought about; enzymes and their functions; the blood and lymph; general metabolism, and the interrelations of organs, are among the important topics studied. Text: Mathews' *Physiological Chemistry*.

Laboratory.—The laboratory work is designed to familiarize the student with the compounds and processes discussed in the lectures and recitations. Laboratory guide: Mathews' *Physiological Chemistry*.

232. PHYSIOLOGICAL CHEMISTRY I. Senior year, first semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisite: Organic Chemistry. Associate Professor Hughes.

This course is designed to meet the needs of students who expect to specialize in nutrition or one of the biological sciences. It treats of the chemistry of carbohydrates, lipins and proteins, and the chemical changes which these undergo during the processes of digestion and metabolism.

Laboratory.—The laboratory work is designed to familiarize the student with the compounds and processes discussed in the class work.

233. PHYSIOLOGICAL CHEMISTRY II. Senior year, second semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisite: Physiological Chemistry I. Associate Professor Hughes.

This is a continuation of Physiological Chemistry I. It includes the chemistry of the body tissues and excretions.

Laboratory.—The laboratory work includes a qualitative and quantitative study of the tissues and excretions discussed in the class work.

234. **BIOCHEMICAL PREPARATIONS** Senior year, second semester. Laboratory work, fifteen hours. Five semester credits. Prerequisites: Organic Chemistry II, and Physiological Chemistry I. Associate Professor Hughes.

This course includes the isolation, purification, and analysis of a number of compounds which are of importance in biochemistry and nutrition.

235. **PATHOLOGICAL CHEMISTRY.** Elective and graduate. Class work, two hours. Two semester credits. Prerequisite: An approved course in physiological chemistry. Associate Professor Hughes.

This course presents the chemical facts pertaining to abnormal nutritional processes. The chemical factors involved in the causation, progress and results of disease are discussed under the following heads: inflammation, degeneration, infection, anemia, tuberculosis, dyspepsia, typhoid fever, jaundice, nephritis, diabetes, gout, rheumatism, intoxication, etc.

240. **ADVANCED QUALITATIVE ANALYSIS** Elective and graduate, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Associate Professor Newman.

This course is designed to broaden the student's knowledge of chemistry by a systematic study of the properties of the acid and basic elements and their compounds as shown in a detailed study of systematic analysis. Many of the rarer elements are included. A study of the application of chemical theory to analytical reactions is taken up in considerable detail with the aim of familiarizing the student with the important theories as applied to analytical procedure. Reports are made on assigned reference work.

241. **QUANTITATIVE ANALYSIS.** Sophomore year, second semester. Class work, one hour; laboratory, twelve hours. Five semester credits. Prerequisite: Chemistry II or its equivalent. Associate Professor Brubaker.

The subject matter considered in this course is practically the same as that given in courses 250 and 251.

242. **FIRE ASSAYING.** Junior year, first semester. Laboratory work, six hours. Two semester credits. Prerequisite: Quantitative Analysis. Associate Professor Newman.

In this course the student becomes familiar with the ordinary methods of fire assaying. Some attention is also paid to wet assaying. Fire assays of ores containing metals such as copper, zinc, lead, bismuth, tin, silver and gold are made.

243. **GAS ANALYSIS.** Junior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Quantitative Analysis. Associate Professor Brubaker.

The work in this course acquaints the student with the use of standard apparatus in the analysis of gases. Analyses of air, flue and furnace, and illuminating gases are made.

245. **MICROCHEMICAL METHODS OF ANALYSIS.** Elective and graduate. Laboratory, three hours. One semester credit. Prerequisites: Elementary Organic Chemistry, and Quantitative Analysis I. Associate Professor Brubaker.

The microscope is a very useful instrument in chemical analyses. The technical chemist finds it indispensable, and its applications are steadily increasing. The object of this course is to teach the student the various methods of using the microscope in chemical analysis, both qualitative and quantitative, applied to both inorganic substances and to vegetable or animal products.

250. **QUANTITATIVE ANALYSIS II.** Elective and graduate, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Associate Professor Brubaker.

This course covers the general procedure of gravimetric analysis and volumetric analysis, together with a discussion of chemical theory as applied to quantitative reactions. Particular attention is paid to the commercial significance of the procedures studied. The work for the first part of the semester consists of a selected series of gravimetric determinations designed to develop accuracy in a number of fundamental operations. During the second part of the semester, solutions of acids, bases and oxidizing agents are standardized and used in analysis. Reports are made on assigned reference work for the study of methods of analysis not taken up in class. Textbook: *Quantitative Analysis*, by Edgar G. Mahin.

251. QUANTITATIVE ANALYSIS III. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Quantitative Analysis II. Associate Professor Brubaker.

This is a continuation of Quantitative Analysis II, and applies the fundamental principles of quantitative work to the analysis of important industrial products and raw materials, including paints, soaps, oils, bituminous materials, coal, gas, water, iron and steel, and other substances, the choice of the work being determined by the instructor in consultation with the student. The chemical theories underlying the methods used are also considered in some detail. Textbook: *Quantitative Analysis*, by Edgar G. Mahin. Other standard works on quantitative analysis are used as references.

252. CHEMISTRY OF SOILS AND FERTILIZERS. Senior year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Quantitative Analysis I. Associate Professor Swanson.

The class work takes up the chemical composition of soils and fertilizers, and those chemical changes in the soil which are most important in affecting plant growth. Attention is also given to colloids and soluble salts in relation to optimum soil conditions. The course is adapted especially to the needs of students of soils.

Laboratory—The laboratory work is planned to give the student a knowledge of the most important chemical methods used in the analysis and investigation of soils and fertilizers.

253. CHEMISTRY OF CROPS. Senior year, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: Organic Chemistry, and Quantitative Analysis I. Associate Professor Swanson.

In the class work a detailed study is made of the chemical composition of substances present in plants and plant products; the most important chemical transformations which take place in plant growth; and enzymes and colloids in relation to plant substances and plant growth.

Laboratory.—The laboratory exercises are planned to give the student a working knowledge of the most important methods used in the analysis and investigation of substances present in plants and plant products.

254. DAIRY CHEMISTRY. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: Organic Chemistry, and Quantitative Analysis I. Associate Professor Swanson.

The class work is centered chiefly upon the following: A detailed study of the chemical compounds present in milk, butter, cheese, and other dairy products; chemical changes affected by conditions of handling dairy products; a review of literature relating to recent investigational work in dairy chemistry.

Laboratory.—The laboratory exercises are designed to give the student a working knowledge of the most important chemical methods used in the analysis and investigation of dairy products.

255. CHEMISTRY OF MEATS. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry, and Quantitative Analysis I. Associate Professor Swanson.

The class work includes the following: A detailed study of the chemical compounds present in the edible portions of meat animals; chemical changes effected by different methods of preparing and storing meat products; a review of recent literature relating to investigational work in the chemistry of meat and meat products.

Laboratory—The laboratory exercises are designed to give the student a working knowledge of the most important chemical methods used in the analysis and investigation of meats and meat products.

256. CHEMICAL RESEARCH. Excellent opportunities are offered students to undertake research work in chemistry. Such work is constantly being conducted in the laboratories of the department in connection with the Agricultural and Engineering Experiment Stations. The State food laboratory and the laboratories for analysis of feeds and fertilizers are also accessible to students desiring research along such lines. Much emphasis is placed upon research in the department, and all students whose training is adequate are encouraged to participate. Work is offered in the following lines:

Agricultural Chemistry. Associate Professor Swanson.

Applied Analytical Chemistry. Associate Professors Newman and Brubaker, and Assistant Professor Latshaw.

Applied Organic Chemistry.

Biochemistry. Associate Professor Hughes and Assistant Professor Hogan.

Applied, General, and Physical Chemistry. Professor King.

257. FOOD ANALYSIS. Junior year, second semester. Laboratory work, nine hours. Three semester credits. Prerequisites: Organic Chemistry, and Quantitative Analysis I. Associate Food Analyst De Rose.

This course includes the quantitative methods employed in the analysis of the various kinds of foodstuffs. It also includes practice in testing for the presence of adulterants, preservatives, and coloring materials.

260. ADVANCED QUANTITATIVE ANALYSIS. Junior year and elective, first semester. One credit for each three hours of laboratory work. Prerequisites: Quantitative Analysis I, or Quantitative Analysis II and III. Associate Professor Brubaker.

Under this heading provision is made for the election of any kind of quantitative chemical work not otherwise designated. The various research and state laboratories afford a large opportunity for advanced work.

265. HOUSEHOLD CHEMISTRY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry. Associate Professor Brubaker.

The lectures cover the chemistry of numerous problems of air, water, soap, laundering, dry cleaning, food and cookery, and textiles. A portion of the lecture time is given to reciting on the subject matter of previous lectures and of the laboratory work. References are given for study.

Laboratory.—The laboratory work consists largely of quantitative exercises dealing with air, water, soap, foods, food accessories, and textiles.

275. CHEMISTRY SEMINAR. Once a week, throughout the year, the officers of the department, with the more advanced students and such others as wish to, meet for papers and discussions upon topics representing the progress of chemical science, chiefly as found in the current journals. The preparation of subjects for presentation at these meetings may be made a part of the credit work of advanced students.

Economics and Sociology

Professor KAMMEYER

Associate Professor MERRITT

Vocational training alone does not fully prepare a student for his life work, nor for the acceptable discharge of his duties as a citizen. It is necessary that he should have at least a general knowledge of the economic and social conditions under which he will live and work, in order that he may become a useful member of society. The State needs men and women trained for citizenship. It is the purpose of this department to plan and direct its work with this need in view.

A department library of well-selected books and pamphlets bearing on economics, sociology and statistics is at the disposal of the students, and is used for collateral readings, book reviews and reports.

COURSES IN ECONOMICS

FOR UNDERGRADUATES

101. **ECONOMICS.** Junior and senior years, both semesters. Class work, three hours. Three semester credits. Professor Kammeyer.

This is a course in the fundamentals of economic science, including a study of man's wealth-getting and wealth-using activities as they manifest themselves in the consumption, production, exchange, and distribution of commodities and services. Budgets, factories and expenses of production, money, banking, wage systems, labor organizations, rent, interest and profits are some of the leading topics for study and class discussion. These phenomena are here studied in conjunction with the laws or social conventions which control or influence them, such as the federal-reserve systems, the farm-loan act, legal restrictions concerning commerce, strikes, child labor, trusts, monopolies, and the like. The application of economic principles to such subjects as taxation, socialism, insurance, etc., is also considered. Supplementary reading of current literature, reference books, the keeping of notes, and periodical written reports are required. A combination of the textbook and lecture methods is followed. Text: Ely's *Outlines of Economics*.

106. **BUSINESS ORGANIZATION** Senior year and elective, both semesters. Class work, one hour. One semester credit. Prerequisite: Economics. Associate Professor Merritt.

Individual proprietorship, partnership and corporation as forms of business organization and management; the advantages and disadvantages of each, and legislative restrictions are studied in this course. The selling plans, advertising methods and systems of credits and collections used by typical manufacturing and distributive industries are made the basis of study and reports. Attention is given also to the origin and operation of markets and exchanges, to cost accounting, and special systems of wage payment. Instruction is by recitations, lectures, and reports. Text: Jones's *Administration of Industrial Enterprises*.

111. **LABOR PROBLEMS.** Elective, both semesters. Class work, two hours. Two semester credits. Associate Professor Merritt.

The history, organization, functions, and legal status of labor unions in the United States and in the principal countries in Europe are discussed. Statistics and judicial decisions relating to strikes, boycotts, picketing, arbitration, etc., are subjects of study and investigation. The course also includes a study of the various plans that have been proposed

and tried for the more equitable distribution of wealth, such as coöperation, profit-sharing, industrial partnership, etc. Instruction is by lectures, assigned readings, and reports. Text: *Groat's Organized Labor in America*.

116. MONEY AND BANKING. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Economics. Professor Kammeyer.

The first half of this course is devoted to a study of the nature, history and functions of money; its place as a factor in man's economic progress, and its importance as such in his business activities as organized to-day; money standards and systems, monometallism, bimetallism, limping standard, paper standard, gold-exchange standard; coinage and coinage laws; instruments of credit, bills of exchange, drafts; clearing houses. The second half of the course takes up the subject of banking. Banking in its historic forms is briefly considered as a preparation for a more detailed study of the federal-reserve system, the federal farm-loan system, and state banks, particularly Kansas state banks. To this is added a study of savings banks, trust companies, building and loan associations and other institutionalized forms of credit. Instruction is by lectures and reports. Any acceptable text, such as *White's Money and Banking*, may be used as a manual.

121. ECONOMIC GEOGRAPHY. Elective, first semester. Class work, three hours. Three semester credits. Professor Kammeyer.

This is a discussion of the important facts of the economic world and a study of production and trade as they are influenced by geographical conditions. The geography of the more important commercial products of farm, range, forest, mine, factory, and sea; transportation and manufactures; great commercial and manufacturing centers, and types of commercial nations are considered. Stress is given to the natural resources of the United States as factors in the national development. This includes the current movement to conserve natural resources; the improvement and extension of waterways; the control of water power and water supply. Instruction is imparted by lectures, library work, and study of a text. (Not offered in 1919-'20.)

126. BUSINESS MANAGEMENT. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Economics. Associate Professor Merritt.

Plant location and structure; the organization and management of industrial forces; distribution of manufactured goods, with especial attention given to the problems involved in relations of manufacturers, middlemen and consumers; the organization of the sales department; sales management and the art of selling; typical advertising campaigns of different classes of producers; costing and its spread to the different elements of production, are subjects studied in this course. Instruction is given by lectures, library work, and study of the text.

131. COST ACCOUNTING. Elective, both semesters. Class work, two hours. Two semester credits. Mr. ———.

Following a review of the principles of accounting, a general survey of the more important principles of cost accounting is made. This course is concerned particularly with the subject of production costs. The student is expected to keep the principles of costing in mind throughout the whole course, to the end that he may be able to adapt these working principles to concrete problems. Attention is given to the calculation and the distribution of overhead costs, and to the organization of cost systems. Practical problems are given for solution and as means of illustrating and applying the principles. Lectures, laboratory work, and study of the text are the methods of instruction. (Not offered in 1919-'20.)

FOR GRADUATES AND UNDERGRADUATES

213. PUBLIC FINANCE Elective, second semester. Class conference, two hours. Two semester credits. Prerequisite: Economics. Professor Kammeyer.

This course embraces a study of public revenues and public expenditures; the development of tax systems; proposed reforms; public indebtedness; budgets; and other phenomena of financial administration. Instruction is by assigned readings, lectures, and reports.

225. CURRENT ECONOMIC PROBLEMS. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Economics. Professor Kammeyer and Associate Professor Merritt.

This course is intended to supplement Economics, course 201, and to give an opportunity to those who elect it to make a more intensive study of selected economic problems than was possible in that course. The subject matter varies, of course, to harmonize with changing economic conditions. At present the problems of economic insecurity, of population, of railway regulation or ownership, of international trade, of trade-unionism and of taxation are of dominant interest and importance. These, or as many of them as time permits, are made the subject of careful study, classroom discussion and written reports. Materials are gathered from reference books, government publications, magazines and newspapers, and especial effort is made to encourage the student to think independently and to formulate his own judgments.

COURSES IN SOCIOLOGY.

FOR UNDERGRADUATES

151. SOCIOLOGY. Elective, both semesters. Class work, three hours. Three semester credits. Associate Professor Merritt.

This course deals with social life in general, involving a study of social origins, activities, and organizations. Such social institutions as the family, the state, the church and the school are studied as to origin, development, organization and aims. The processes of socialization, social forces, and social control, particularly as they manifest themselves in rural life, receive special emphasis. Consideration is given also to social pathology; poverty, its causes and remedies; crime, its causes and prevention; and to remedial legislation and correctional agencies. The aim of the course is to help the student to get his social bearings and to find himself as a fact and a factor in the complex interrelations of human society. Assigned library readings and special written reports are required. Instruction is by recitation, class discussion and lectures. Text: Hayes's *Introduction to Sociology*.

156. RURAL SOCIOLOGY. Elective, both semesters. Class work, three hours. Three semester credits. Associate Professor Merritt.

This course deals with the problem of the rural family, the rural school, the rural church, rural societies and associations, the economic and social activities of the community, and the relation of the state to the general welfare. Reasons for the increased interest in rural sociology and problems; the effect of environment and occupation on community life; advantages and disadvantages of rural life; marketing and transportation as factors of community development; the various social institutions of the community, boys' and girls' clubs, men's clubs, the grange, and their possible economic and social activities; the country-life movement, and the reorganization of rural and social forces are then taken up. The interdependence of town, city and rural life are studied, with special emphasis on conditions as they exist in this State. Instruction is by assigned readings, lectures, and recitations. Text: Voght's *An Introduction to Rural Sociology*.

FOR GRADUATES AND UNDERGRADUATES

257. SOCIAL PROBLEMS. Elective, both semesters. Class work, two hours. Two semester credits. Associate Professor Merritt.

A study of social conditions and social legislation, with constructive methods of dealing with present social conditions. Stress is given in the early part of the course to the practical handling of statistical material for the purpose of acquainting students with the most important work done in the field of social inquiry. A study is made of unemployment, old age, invalidity pensions and sickness insurance, workmen's compensation, minimum-wage laws, mothers' pensions, assistance to school children, charity organizations, and employment bureaus. State-aided schemes of social reform and publicity as a means of social reform and control are discussed. Instruction is given by lectures, text, and library work.

260. COMMUNITY PROBLEMS. Elective, both semesters. Class work, one hour. One semester credit. Associate Professor Merritt.

A study is made of the larger problems of urban and rural community life, considered from the sociological standpoint. Agencies and movements for organization, development and improvement; surveys; community centers; schools and churches; granges; agencies of public health, safety, recreation, and charity—all these are investigated. Attention is given to the methods for studying a community so that it may find and organize itself for improvement. Field work, lectures, and library work are the methods of instruction. Arrangements may be made for extended credit by doing more extended field work than is required by the course. (Not offered in 1919-'20.)

263. THEORIES OF SOCIAL PROGRESS. Elective, both semesters. Class conference, two hours. Two semester credits. Prerequisites: Sociology and Economics. Associate Professor Merritt.

A historical survey of social philosophy is made, and this is followed by a detailed study of current theories as they are being applied by theorists to the social problems of the day. Especial attention is given to the interdependence of economic and social theory. Instruction is by assigned readings, lectures, and recitations. Text: *Theories of Social Progress*, by Todd.

266. SOCIAL PSYCHOLOGY. Elective, both semesters. Class conference, two hours. Two semester credits. Prerequisite: Sociology. Associate Professor Merritt.

The social self and the process of its development are studied, together with applications to a variety of social problems, in order to establish a viewpoint, a method for all social sciences. Instruction is by assigned readings, lectures, and recitations. Text: *An Introduction to Social Psychology*, by Ellwood.

Education

Professor HOLTON
 Professor KENT*
 Associate Professor ANDREWS
 Associate Professor PETERSON

Assistant Professor DAVIDSON
 Assistant Professor LLOYD-JONES*
 Assistant Professor CAVE†
 Doctor HOLTZ

The courses in this department have for their controlling purpose the professional training of teachers. Two types of courses are offered: (1) courses that give the broad, fundamental principles upon which public education is based, and (2) courses that develop technique and skill in school management and the organization of the subject matter

* Resigned.

† Second semester, 1919-'20.

of the curriculum. All courses are based upon the proposition that education supported by public taxation should function in social and vocational efficiency.

The State Board of Education has set up the following standards for the certification of teachers:

1. Three-year Certificates Renewable for Life.

- a. Complete four years of College work.
- b. At least eighteen hours of the four years' work must be taken in the Department of Education as follows: (1) Three semester hours in Psychology, three in Educational Administration and three in Educational Psychology or Educational Sociology. (2) Nine semester hours elected from the Department of Education.
- c. Credit obtained in college courses in the teaching of special subjects will be accepted to the extent of three semester hours to apply on the required credits in Education, provided that these courses are conducted with the approval of the College Department of Education and are offered in the junior or senior year, with preliminary preparation as follows:

English.—Not less than fifteen semester hours of college credit, following at least three high-school units.

Foreign Language.—Not less than fifteen semester hours of college credit in the language in which the teachers' course is taken, following at least three high-school units or equivalent in some foreign language or languages.

Mathematics.—Not less than fifteen semester hours of college credit, following at least two high-school units.

Physical Science.—Not less than ten semester hours of college credit in the science in which the teachers' course is taken, following at least two high-school units or equivalent in physical science.

Biological Science.—Not less than ten semester hours of college credit in the science in which the teachers' course is taken, following at least two high-school units or equivalent in biological science.

History.—Not less than ten semester hours of college credit, following at least two high-school units or equivalent.

In any of the above, six hours of college credit will be regarded as the equivalent of one high-school unit.

- d. Valid in any elementary school or high school in Kansas.

2. Three-year Certificates Renewable for Three-year Periods.

- a. Complete at least two years of College work, including three semester hours in Psychology, three in Educational Administration, and three in Methods of Teaching or equivalent courses in the Department of Education which may be acceptable to the State Board of Education.
- b. Valid in any elementary school, junior high school or high school offering not more than a two-year course of study.

3. Certificates for Teachers and Supervisors of Public-school Music.

- a. Complete at least two years of College work, including the following:
 - (1) Not less than twenty-eight semester hours in technical courses in Music.

- (2) Three semester hours in Psychology, three in Educational Administration, and three in Methods of Teaching.
 - (3) Not less than eight semester hours in Methods of Teaching Public-school Music.
 - b. Valid for three years and may be renewed for three-year periods.
4. Certificates for Teachers and Supervisors of Physical Education.
- a. Complete at least two years of College work, including the following:
 - (1) Not less than twenty-eight semester hours in the Department of Physical Education.
 - (2) Three semester hours in Psychology, three in Educational Administration and three in Methods of Teaching.
 - b. Valid for three years and may be renewed for three-year periods.
5. Certificates for Teachers and Supervisors of Manual Training.
- a. Complete at least two years of College work, including the following:
 - (1) Not less than twenty-eight semester hours in the Department of Shop Practice.
 - (2) Three semester hours in Psychology, three in Educational Administration, and three in Methods of Teaching.
 - b. Valid for three years and may be renewed for three-year periods.
6. Certificates for Teachers of Vocational Agriculture.
- a. Complete four years of College work, including the following:
 - (1) Not less than forty-two semester hours in technical agriculture.
 - (2) Eighteen semester hours in the Department of Education; viz., three in Psychology, three in Educational Administration, three in Educational Sociology, three in Agricultural Education, three in Special Methods in Agriculture, and three in Supervised Observation and Teaching.
 - b. Valid for three years and may be renewed for life.
7. Certificates for Teachers of Vocational Home-making.
- a. Complete four years of College work, including the following:
 - (1) Not less than thirty-six semester hours in technical home economics.
 - (2) Eighteen hours in the Department of Education; viz., three in Psychology, three in Educational Administration, three in Educational Sociology, three in Home Economics Education, three in Special Methods in Home Economics, and three in Supervised Observation and Teaching.
 - b. Valid for three years and may be renewed for life.

COURSES IN EDUCATION**FOR UNDERGRADUATES**

101. **PSYCHOLOGY I.** Freshman or sophomore year, second semester. Class work, three hours. Three semester credits. Required for three-year State certificate. Associate Professor Peterson.

This is an introductory course in psychology for teachers. It consists primarily in a study of the nature of the learning process and of the conditions and methods of study which favor the most rapid and effective progress in learning. The distribution and significance of individual differences and other related topics will also receive attention.

102. **PSYCHOLOGY II.** Freshman year, first semester. Class work, three hours. Three semester credits. Required for State teachers' certificate in music. Associate Professor Peterson.

This is an adaptation of course 101 to the special needs of music teachers. Less time is devoted to the study of learning and some attention is given to the analysis of musical ability into its elemental capacities. A study is made of the methods of measurement of some of these capacities.

103. **PSYCHOLOGY III.** Junior year and elective, first or second semester. Class work, three hours. Three semester credits. Required for State life certificate. Associate Professor Peterson.

The aim of this course is to give a fair acquaintance with the more fundamental facts and problems of the entire field of psychology and with the methods by which new facts are ascertained and evaluated. Special attention is given to the psychological factors which directly influence personal efficiency.

104. **PSYCHOLOGY IV.** Junior or senior elective, both semesters. Associate Professor Peterson.

This course is essentially similar to Course 103, but more attention is given to those phases of individual and applied psychology which bear directly on the practical problems of daily life. Students in agriculture, engineering, and industrial journalism who desire some work in psychology should enroll in this section.

105. **EDUCATIONAL ADMINISTRATION I.** Elective, first or second semester. Class work, three hours. Three semester credits. Required for State teachers' certificate. Associate Professor Andrews.

This course is a study of the organization of state, city and county school systems, with special emphasis upon rural and vocational schools; the interrelation of the functions of boards of education, superintendents, principals, teachers. Study of the school law of Kansas is an important part of the course.

106. **EDUCATIONAL ADMINISTRATION II.** Elective, first or second semester. Class work, three hours. Three semester credits. Professor Kent.

This course is similar to 105 in the general principles of educational administration in a democracy, but differs from it in that it gives special emphasis to the administration and supervision of vocational agriculture, homemaking, and trades and industry. Students preparing to teach these subjects should take this course rather than 105.

109. **EDUCATIONAL PSYCHOLOGY.** Elective, first or second semester. Class work, three hours. Three semester credits. Required for State teachers' certificate. Prerequisite: Psychology. Associate Professor Peterson.

The course deals with those aspects of psychology that have a direct bearing upon educational practices. Attention is paid to the results of experimental investigations in the field. Instruction is by lectures and library work.

113. HISTORY OF EDUCATION I. Elective, first or second semester. Class work, three hours. Three semester credits. Associate Professor Andrews.

This course is intended to present the successive relationships that have existed between educational machinery and practices, and the changing political, economic, scientific, cultural and ideal environments from primitive times to the present.

118. EDUCATIONAL SOCIOLOGY I. Elective, first or second semester. Class work, three hours. Three semester credits. Professor Holton.

This course deals with the concrete objectives of education considered as a process of social adjustment; the meaning of education in a democracy; the educative functions of the home, the community, the church and the school; the school as a special environment; the meaning of labor and leisure; cultural and vocational education; intellectual and practical studies; and physical and social studies.

119. EDUCATIONAL SOCIOLOGY II. Elective, first or second semester. Class work, three hours. Three semester credits. Professor Holton.

This course is similar to 118 in general principles of education in a democracy, but differs from it in that it deals with the concrete objectives in vocational agriculture, homemaking, and trades and industry. Students preparing to teach these subjects should take this course rather than 118.

121. HOME ECONOMICS EDUCATION. Elective, first or second semester. Class work, two hours. Two semester credits. Required of all candidates for State teachers' certificates who are preparing to teach home economics. Prerequisite: Foods I and II, Clothing I and II. Assistant Professor Lloyd-Jones.

This course considers problems dealing with the place of home economics in modern secondary education; the aims and the organization of the work in various types of schools; the administration, maintenance, equipment and supervision of departments of home economics. Special attention is paid to Kansas conditions.

125. AGRICULTURAL EDUCATION. Elective, first semester. Class work, two hours. Two semester credits. Required of all candidates for State teachers' certificates who are preparing to teach agriculture. Prerequisite: Educational Administration. Professor Kent or Assistant Professor Davidson.

A comparative study is made of the provisions for agricultural education in Kansas and other states and countries and of the principles underlying such education. The part played in agricultural education by community, county, state and nation is discussed. Types of schools, courses of study, adjustment of school work to community needs, and the equipment and administration of agricultural schools are studied. The aim of the course is to fit the student to plan, teach and administer or supervise agricultural work, especially in high schools.

129. INDUSTRIAL EDUCATION. Elective, first semester. Class work, two hours. Two semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach manual training, shop work, trade courses, and other industrial subjects. Prerequisite: Educational Administration. Professor Kent.

This course is a study of typical secondary schools of industrial education and departments of industrial education in public schools; of the industrial schools of Germany and other foreign systems; of the making of a course of study in industrial education for secondary schools; and of shop equipment and costs.

132. SPECIAL METHODS IN THE TEACHING OF HOME ECONOMICS. Elective, first or second semester. Class work, three hours. Three semes-

ter credits. Expected of all candidates for State teachers' certificates who are preparing to teach home economics. Prerequisites: Foods I and II, Clothing I and II, and Psychology. Assistant Professor Lloyd-Jones.

This course applies the principles of sound teaching to the selection and development of the subject matter of home economics in lessons for high-school pupils and to the conduct of laboratory and classroom exercises. It is supposed to accompany course 141.

136. SPECIAL METHODS IN THE TEACHING OF AGRICULTURE. Elective, second semester. Class work, three hours. Three semester credits. Required of all candidates for State teachers' certificates who are preparing to teach agriculture. Prerequisite: Psychology. Professor Kent or Assistant Professor Davidson.

Training in planning lessons, organizing materials, and conducting class and laboratory work in agriculture is the purpose of this course. The work includes observation, criticism and reports of class exercises, a study of work done in high schools, and the making and criticism of lesson plans and outlines. Special attention is given to the selection of laboratory materials, the supervision of laboratory exercises, and the adaptation of class and laboratory work to each other.

140. SPECIAL METHODS IN THE TEACHING OF INDUSTRIAL ARTS SUBJECTS. Elective, second semester. Class work, three hours. Three semester credits. Expected of all candidates for the State teachers' certificate who are preparing to teach industrial subjects. Prerequisites: Mechanical Drawing II, Woodworking II, and Educational Psychology. Professor Kent or ———.

The various lines of work included under the head of industrial arts are studied and a series of progressive lessons worked out in each of these lines emphasizing important elements. A study is made of the various materials employed and the methods of utilizing them for the needs of pupils. The arrangement of courses, the outlines and presentation of assignments, the preparation of assignments, the preparation of laboratory material and the conduct of laboratory exercises are taken up. The work includes recitations, class discussions, assigned readings and written reports.

141. SPECIAL METHODS IN THE TEACHING OF PHYSICS. Elective. Class work, two hours; laboratory, three hours. Three semester credits. Assistant Professor Raburn.

(See Department of Physics, course 224.)

142. SPECIAL METHODS IN THE TEACHING OF MATHEMATICS. Elective. Class work, three hours. Three semester credits. Assistant Professor Stratton.

(See Department of Mathematics, course 122.)

143. SPECIAL METHODS IN THE TEACHING OF HISTORY. Elective, first or second semester. Class work, two hours. Two semester credits. Associate Professor Iles.

(See Department of History, course 127.)

144. SPECIAL METHODS IN THE TEACHING OF ENGLISH. Elective, second semester and summer school. Class work, three hours. Three semester credits. Professors Searson and Davis.

(See Department of English, course 134.)

160. SUPERVISED OBSERVATION AND TEACHING IN HOME ECONOMICS. Elective, first or second semester. Three semester credits. Prerequisites: Foods I and II, Clothing I and II, and Special Methods in the Teaching of Home Economics. Assistant Professor Lloyd-Jones.

Students whose qualifications are accepted for this course will serve as teachers of sewing and cooking in the classes of the junior high school of Manhattan.

161. SUPERVISED OBSERVATION AND TEACHING IN AGRICULTURE. Elective, first or second semester. Three semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach agriculture. Prerequisite: Educational Psychology. Professor Kent or Assistant Professor Davidson.

Students expecting to teach take this work as a part of the regular class in the School of Agriculture. The work is supervised by a member of the Department of Education and by the regular class teacher. Both teachers criticise lesson plans and presentation.

162. SUPERVISED OBSERVATION AND TEACHING IN INDUSTRIAL ARTS. Elective, first or second semester. Three semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach industrial arts. Prerequisite: Educational Psychology. Professor Kent or ———.

Industrial classes conducted by experienced teachers are visited and careful observations are made in regard to sequence of courses, methods of presentation, interest, class order, and other phases of class work. Reports are presented on this work for discussion. Students are assigned teaching work under careful supervision, results are noted and suggestions are made for individual improvement.

FOR GRADUATES AND UNDERGRADUATES

201. RURAL EDUCATION. Elective, first or second semester. Class work, three hours. Three semester credits. Prerequisite: Educational Administration. Professor Holton or Professor Kent.

This course deals with extension education, boys' and girls' club work, the problems of the rural high school, one-room schools, consolidation, social centers, farmers' organization, and all forms of organized community life in the open country, in so far as they bear on the problems of public education. A certain amount of field work is required in connection with the course.

211. MENTAL AND EDUCATIONAL MEASUREMENTS. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Psychology. Associate Professor Peterson.

This course is designed to give a working knowledge of the fundamental principles of educational measurement and an appreciation of the significance of the measurement movement in education. A careful study is made of standard educational tests and scales, with special emphasis upon their value in the improvement of classroom methods and conditions of learning. Attention is given to such statistical methods and devices as are needed for the interpretation of data.

215. APPLIED PSYCHOLOGY. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Psychology. Associate Professor Peterson.

A study is made of the psychological conditions of personal, industrial and business efficiency as determined by observation and experiment in such special fields as advertising, salesmanship, employment, scientific management, etc. Special attention is given to the use of psychological tests in employment, vocational guidance, etc.

220. THE AMERICAN HIGH SCHOOL. Elective, first or second semester. Class work, three hours. Three semester credits. Associate Professor Andrews.

The course considers the history of secondary education in America with reference to its historic background. The history of the secondary

curriculum, the social function of the high school, its administration and the place and importance of each subject in the course of study will receive consideration.

221. **EXTENSION METHODS AND PROBLEMS.** Elective, second semester. Class work, two hours. Two semester credits. Professor Kent and members of the Extension Division.

The origin and development of extension work, its aim and purposes and relation to other general educational activities are briefly reviewed. The organization and administration of extension work under the Smith-Lever law and the part taken by colleges and the Department of Agriculture; types of extension work conducted by bankers, railroads, manufacturers, and other agencies; and future problems of extension work, are studied.

222. **RURAL ORGANIZATION.** Elective, second semester. Class work, two hours. Two semester credits. Professor Holton and Director Burr.

In this course a study is made of the principles and projects of rural organized activities; the history and development of organizations for rural improvement and progress; the function of such organizations in promoting rural progress and welfare; and the organization, aims and accomplishment of typical rural organizations.

224. **RURAL LEADERSHIP.** Elective, second semester. Class work, one hour. One semester credit. Professor Holton and Director Burr.

This course is a study of the place and function of rural leadership in community development; of how leaders are developed and how they may be used by extra-community agencies in coöperating with the community in movements for community improvement.

FOR GRADUATES

301 and 302. **EDUCATIONAL SEMINAR I AND II.** Open to candidates for the master's degree. First and second semester, respectively. Class work, two hours. Four semester credits on completion of both courses. Prerequisites: Psychology and Educational Administration. Professor Holton and other members of the graduate faculty.

The work consists of lectures, reports, and class discussions. Each member of the seminar chooses a topic early in the term for special investigation. Preliminary reports are made to the class from time to time and the final results of the study are embodied in a carefully prepared report.

303. **EDUCATIONAL SOCIOLOGY III.** Open to candidates for the master's degree. Both semesters and summer session. Class work, three hours. Three semester credits. Professor Holton.

This course has for its purpose the discovery of the fundamental social objectives for the curricula in high schools and colleges.

306. **EDUCATIONAL ADMINISTRATION III.** Class work, three hours. Three semester credits. Associate Professor Andrews.

The subjects considered are: The financial basis of public education, formation of budgets, structure and administration of the curriculum, administration of vocational training, essentials of the elementary curriculum, use of standard tests and interpretation of data. The problems of supervision as they relate to promotion, retardation and failure will be considered.

307. **HISTORY OF EDUCATION II.** Class work, three hours. Three semester credits. Associate Professor Andrews.

The purpose of the course is to show the intellectual background of history, to sketch rapidly the ethical and educational ideas of the ancient world, the Hellenization of the orient, the rise of Christianity and the development of the Renaissance. Political and social history is considered

only to interpret the educational plan and purpose of the period. Finally, we consider the modern scientific spirit and the modern educational theories, purposes and ideals.

325. **THESIS.** Required of all candidates for the degree of master of science whose major work is in the Department of Education. First and second semesters. Hours of work and credit arranged in conference with the head of the department.

The problem selected for research and investigation must be approved by the graduate faculty of the department.

COURSES IN RELIGIOUS EDUCATION

FOR UNDERGRADUATES

180. **RELIGIOUS EDUCATION I.** Elective, first semester. Class work, three hours. Three semester credits. Doctor Holtz.

The controlling purpose of the courses in religious education is the preparation of teachers for Sunday schools. The need for better prepared teachers and for better teaching is recognized by everyone who is familiar with the work of the Sunday schools.

This course comprises a study of the origin of the Bible; the Bible as a social inheritance; the Old Testament history with special emphasis upon the social message of the prophets; the New Testament with attention given to the social teachings of Christ.

182. **RELIGIOUS EDUCATION II.** Elective, first semester. Class work, three hours. Three semester credits. Doctor Holtz.

The fundamental instincts, the physiological and psychological characteristics of the various stages of development, and the best methods of moral and religious instruction suited to these stages are studied in this course.

184. **RELIGIOUS EDUCATION III.** Junior or senior, elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Psychology. Doctor Holtz.

A study is made of the recognized principles underlying modern religious education; the organization of Sunday schools, the subject matter best adapted to each department of the organization; and the application of modern methods of teaching.

English

Professor SEARSON
Professor MACARTHUR
Professor DAVIS
Associate Professor CONOVER
Associate Professor BURNS
Assistant Professor RICE
Assistant Professor HEIZER

Assistant Professor ALDER*
Instructor LEONARD
Instructor RUSSEL
Instructor CHRISTOPH
Instructor FULLER
Instructor BOWER

Ability to think well and to speak well, and capacity to appreciate the world's best literature, are recognized essentials of a liberal education. The work of the Department of English is to acquaint the student with the best standards of English practice and appreciation, and to encourage him to maintain these standards in all his work. To this end the department offers studies in cultural and technical English and special drills in expressing thought freely and effectively in matters touching the vital interests of the student. The study of the English lan-

* In charge of correspondence work in English in Home Study Service, Division of Extension.

guage and literature is thus made the means of increasing the power and efficiency of the individual. It is therefore the aim of the department, in coöperation with the technical departments of the College, to increase the knowledge and effectiveness of the students.

COURSES IN ENGLISH LANGUAGE

FOR UNDERGRADUATES

101. COLLEGE RHETORIC I. Freshman year, both semesters and summer school. Class work, three hours. Three semester credits. Prerequisite: Three units of high-school English. Professor Searson, Professor Macarthur, Professor Davis, Associate Professors Conover and Burns, Assistant Professors Rice and Heizer, Miss Leonard, Miss Russel, Mr. Christoph, Miss Fuller, and Miss Bower.

After a series of tests to determine the fitness of the student to pursue the work of the course, a rapid, thorough review of the essentials of English is given, special attention being paid to sentence and to paragraph structure. This is followed by themes designed to develop the student's ability to tell accurately what he knows, to describe interestingly what he sees, and, above all, to enable him to relate the subject of English to the work which he expects to do in after life. Texts: Greever and Jones, *Century Handbook of Writing*; Cunliffe and Lomer, *Writing of To-day*, first half.

104. COLLEGE RHETORIC II. Freshman year, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Professor Searson, Professor Macarthur, Professor Davis, Associate Professors Conover and Burns, Assistant Professors Rice and Heizer, Miss Leonard, Miss Russel, Mr. Christoph, Miss Fuller, Miss Bower.

This course is a continuation of the work in College Rhetoric I. Special emphasis is laid on outlining and on expository and argumentative writing. Attention is directed to practical as well as to literary subjects for the frequent themes written throughout the course. Texts: Canby and others, *English Composition in Theory and Practice*; Cunliffe and Lomer, *Writing of To-day*, second half.

107. SPECIAL ENGLISH. Freshman year, both semesters. Class work, three hours. No credit. Professor Davis and Assistant Professor Rice.

This course is a review of the essentials of English composition, accompanied by drills in sentence structure and in idiomatic expression, by special exercises and by consultations. It is required of any student assigned to College Rhetoric I who within the first few weeks of the work of that course shows that he is unable to express his ideas clearly and accurately. Textbook: Greever and Jones, *Century Handbook of Writing*.

110. ENGINEERING ENGLISH. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Professor Macarthur and Professor Davis.

This is an advanced course in English particularly adapted to the needs of engineers. The general problems of engineering writing are discussed. Specific assignments are made in the writing of business letters relating to engineering, and in the preparation of technical manuscripts and reports. Essays of especial value to the engineer are read and analyzed. Texts: Watt, *The Composition of Technical Papers*; Aydelotte, *English and Engineering*.

113. ADVANCED COMPOSITION I. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Associate Professor Conover.

In this course special emphasis is given to the subject of exposition. The subjects of the themes required are taken as far as possible from the student's particular field of work. Models of reports, explanations and general expository work are carefully studied. Text: Jelliffe, *Handbook of Exposition*.

116. ADVANCED COMPOSITION II. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Advanced Composition I. Associate Professor Conover.

Narrative writing is studied in this course, both in its relation to the other forms of composition and as an independent form. The practical forms of narrative are studied in detail, and attention is given to the short story. Text: Buck and Morris, *Narrative Writing*.

119. ARGUMENTATION AND DEBATE. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Associate Professor Burns.

This course includes a systematic study of the theory of debate; brief making; classroom practice in debating, in defending propositions, and in extemporaneous speaking; the proper method of collecting and classifying material; and effective methods of refuting arguments. Consultations, library investigations and special group conferences form helpful laboratory features of the course. Text: Stone and Garrison, *Essentials of Argument*.

122. BUSINESS ENGLISH. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professors Searson and Davis.

This course comprises a thorough review of business forms and general business writing, with special attention to business correspondence and special sales letters. A close study is made of the principles of effective writing as they are found applied in the best writing in the commercial world. Text: Gardner, *Effective Business Letters*.

125. ADVERTISING ENGLISH. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis.

This course offers a study of the principles of effective English as they are applied in present-day advertising writing. A preliminary survey of the principles of advertising is made in the early part of the course. Later actual practice is given in the writing and printing of the fundamental types of advertisements. Text: Hall, *Writing an Advertisement*.

128. ORAL ENGLISH I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Professor Macarthur and Assistant Professor Heizer.

In this course a study of the principles of oral composition and practice in oral composition in the form of explanations, narrations, descriptions, selling and other business talks, travel talks and speeches for special occasions are offered. For materials for the exercises given in class, students are directed to cultural subjects, more particularly to painting, sculpture, architecture, and music. Text: Brewer, *Oral Composition*.

131. ORAL ENGLISH II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Professor Macarthur and Assistant Professor Heizer.

This course is a continuation of Oral English I, but does not require it as a prerequisite. Attention is directed especially to the forms of oral English more commonly employed, such as conversation, the toast or after-dinner speech, introductions, nominations, announcements, pres-

entations, and the like. For reading the students are directed to current magazines so as to be able to discuss current events of all kinds. Text: Brewer, *Oral Composition*.

134. METHODS OF TEACHING ENGLISH. Elective, second semester and summer school. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professors Searson and Davis.

This course is planned to meet the needs of those who are called upon to teach English in connection with the applied sciences. The course of study, the application of English instruction to life needs and definite methods of motivating English instruction are specially considered. Text: Carpenter, Baker, and Scott, *The Teaching of English*.

137. AGRICULTURAL ENGLISH. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis and Associate Professor Conover.

This course consists of a rapid review of the essentials of English composition as applied in the business writing of the modern farmer. Business correspondence, bulletin writing, the organization of short business talks, and the basic principles of farm advertising are considered. The problems of writing that confront the county agent, the high-school teacher of agriculture, and the farm manager are made the subject of discussion and practice.

FOR GRADUATES AND UNDERGRADUATES

201. FARM ADVERTISING. Elective, first semester. Class work and practice, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis.

How to advertise all kinds of farm produce in order to secure regular customers by parcel post or by direct delivery is the object of this course. The student is shown how to write the most effective copy for "display ads.," "story ads.," and handbills, and how to feature the central point in each advertisement. The course includes the collection of the most important facts concerning farm produce and such study of markets and marketing as is necessary. Text: Starch, *Advertising*.

204. FARM BULLETINS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Professor Davis.

In this course the student is required to make an extensive study of farm bulletins and the essentials of writing good bulletins. How to write in a simple, direct style that appeals to the readers for whom the bulletin is intended is the subject of careful study. Current farm bulletins are made the basis for the work. The student is permitted to take the facts he has collected in connection with the work of other classes and to use them in working out special reports required in this course. The course is designed especially for those who intend later to write farm bulletins.

207. TECHNICAL WRITING. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: One of the following courses: 113, 116, 122, 125, 201, 204. Professors Searson and Macarthur.

This course is planned to help students properly to record and to report technical work. Fundamental principles of technical writing are studied in connection with such practice as will necessitate clearness, accuracy, and effectiveness. Text: Watt, *The Composition of Technical Papers*.

251. THE SHORT STORY. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Assistant Professor Rice.

Practice in writing short stories, based upon thorough study of the world's best short stories, is offered in this course. The principles which underlie the material and structure of the short story—plot, setting, action, and character analysis—are especially emphasized. Text: Esenwein, *Writing the Short Story*; Ashmun, *Modern Short Stories*.

254. COMMUNITY ENGLISH. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Literature I. Professor Searson and Assistant Professor Heizer.

This course comprises the study and practice of the English work most needed in the activities and recreations of community life. A detailed study is made of the pageant. The class is organized as a special group and its members are trained in the various forms of procedure that may be required in the rural community. Text: Bates and Orr, *Pageants and Pageantry*.

FOR GRADUATES

301. HISTORY OF LANGUAGE I. Elective, first semester. Class conference, two hours. Two semester credits. Prerequisite: English Literature II. Professors Searson and Macarthur.

This course offers a study of the origin and development of the English language. Special emphasis is placed on Old English. Texts: Wyld's *Historical Study of the Mother Tongue* and Bright's *Anglo-Saxon Reader*.

302. HISTORY OF LANGUAGE II. Elective, second semester. Class conference, two hours. Two semester credits. Prerequisite: English Literature II. Professors Searson and Macarthur.

This course is a continuation of History of Language I. Special emphasis is placed on Middle English and Modern English. Texts: Wyld's *Historical Study of the Mother Tongue* and Emerson's *Middle English Reader*.

304. SPECIAL STUDIES IN APPLIED ENGLISH. Elective, second semester. Class conference, two hours. Two semester credits. Prerequisite: History of Language II. Professor Searson and Associate Professor Conover.

Individual assignments are made in the fundamental fields of research in applied English. The student is required to carry on an original investigation and to make an acceptable report of his research work.

COURSES IN ENGLISH LITERATURE

FOR UNDERGRADUATES

171. ENGLISH LITERATURE I. Sophomore year, both semesters and summer school. Class work, four hours. Four semester credits. Prerequisite: College Rhetoric II. Professor Searson, Professor Davis, Associate Professors Conover and Burns, Assistant Professors Rice and Heizer, Miss Leonard, Miss Russel, Mr. Christoph, Miss Fuller, and Miss Bower.

In this course the students are made familiar with the principles of literary appreciation and are taught to apply them to selected texts in narrative, lyric and dramatic poetry, as well as in fiction, the essay, and the oration. The work of the course is intensive, notebooks are kept, and frequent tests are given. Texts: Heydrick, *How to Study Literature*, and Cunliffe, Pyre, and Young, *Century Readings in English Literature*.

174. ENGLISH LITERATURE II. Sophomore year, both semesters and summer school. Class work, four hours. Four semester credits. Prerequisite: English Literature I. Professors Searson and Davis, Associate Professors Conover and Burns, Miss Leonard, Miss Russel, Mr. Christoph, Miss Fuller and Miss Bower.

This course presents history of English literature by means of lectures and of discussions of the text. Extensive assignments in reading are made, and reports are given in class. Weekly tests are required. Texts: Long, *English Literature*, and Cunliffe, Pyre, and Young, *Century Readings in English Literature*.

177. ENGLISH LITERATURE HE-I. Sophomore year, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis, Assistant Professors Rice and Heizer, Miss Russel, and Miss Bower.

This course offers in slightly condensed form the work given in course 171. Texts: Heydrick, *How to Study Literature*, and Cunliffe, Pyre, and Young, *Century Readings in English Literature*.

180. ENGLISH LITERATURE HE-II. Sophomore year, both semesters. Class work, three hours. Three semester credits. Prerequisite: English Literature HE-I. Professor Davis, Associate Professor Conover, Assistant Professors Rice and Heizer, Miss Russel, and Miss Bower.

This course presents a history of English literature in much the same way as course 174. The amount of reading required is slightly less. Texts: Long, *English Literature*, and Cunliffe, Pyre, and Young, *Century Readings in English Literature*.

FOR GRADUATES AND UNDERGRADUATES

271. THE ENGLISH BIBLE I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professor Macarthur.

This course familiarizes the student with the different kinds of literature found in the English Bible. A careful study is also made of the style of that great classic in order to discover the secrets of its simplicity, clearness, and power. Text: Moulton, *Short Introduction to the Literature of the Bible*.

272. THE ENGLISH BIBLE II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professor Macarthur.

This course, while being a continuation of The English Bible I, is in itself an independent unit and does not require The English Bible I as a prerequisite. Text: Moulton, *Modern Reader's Bible*.

274. THE SHAKSPEREAN DRAMA. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professor Searson and Professor Macarthur.

This course includes a study of Shakspeare's life and times and the reading of ten of his greatest plays. Text: Boas, *Shakspeare and His Predecessors*.

277. NINETEENTH CENTURY LITERATURE. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature II. Professor Macarthur and Associate Professor Conover.

In this course there is discussion of the literary movements found throughout the century, especially in the Victorian period. Significant works are read and are made the subjects of class reports and discussions. Text: Saintsbury, *Nineteenth Century Literature*.

280. AMERICAN LITERATURE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professor Davis and Assistant Professor Heizer.

The course consists of lectures on the history of American literature and of class reports on assigned readings. A special study is made of the standard works of the chief American authors. Text: Curtis Hidden Page, *Chief American Poets*.

282. CURRENT LITERATURE. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: English Literature I. Associate Professor Conover.

It is the aim of this course to establish a definite basis or standard of literary criticism and appreciation by an inductive study of contemporary literature. The course includes a consideration of the best works of such literary figures as Tagore, Henry James, Maeterlinck, Galsworthy, Anatole France, Thomas Hardy, Tchekov, Bernard Shaw, Selma Lagerlof, Emile Verhaeren, Arnold Bennett, Stephen Phillips, Wm. Butler Yeats, J. M. Synge, Alfred Noyes, and the younger group.

285. THE NOVEL. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Literature II. Associate Professor Conover and Miss Russel.

A study of the English novel, including the discussion of its historical development, its relation to other forms of fiction, and its place in contemporary literature. Especial attention is given to representative works of modern writers, both English and American. Text: Cross, *The Development of the English Novel*.

288. ENGLISH SURVEY I. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature, or its equivalent. Professor Searson, Professor Macarthur.

This course offers an advanced study in the history of English literature. Beginning with Anglo-Saxon times, the course continues through the Middle English period down to the close of the Elizabethan period. Text: Garnett and Goss, *History of English Literature*, Vols. I and II.

290. ENGLISH SURVEY II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Survey I. Professors Searson and Macarthur.

This course is a continuation of English Survey I. It traces the rise of Puritanism and its influences on English literature. Emphasis is placed upon the classical movement. A brief survey is made of romanticism and its development. Text: Garnett and Goss, *History of English Literature*, Vols. III and IV.

292. BROWNING. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professors Searson and Macarthur.

This course offers a study in the interpretation of the most important poetic and dramatic works of Robert Browning. Texts: Browning's *Complete Poetical Works* and Phelps' *Browning, How to Know Him*.

294. TENNYSON. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professors Searson and Macarthur.

This course offers a study in the interpretation of the most important poetic works of Alfred Tennyson. Texts: Tennyson's *Complete Poetical Works* and Van Dyke's *The Poetry of Tennyson*.

295. THE ARTS AND CRAFTS MOVEMENT. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature, or its equivalent. Professor Macarthur.

This course takes as its basis the life of William Morris, and treats of the arts and crafts movement in its relation to literature. Works of Morris, Rossetti, Ruskin, and other writers of the same group are read and discussed. Text: Mackail's *Life of William Morris*.

FOR GRADUATES

310. THE ROMANTIC MOVEMENT I. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature. Professor Searson and Associate Professor Conover.

This course offers advanced work in the study of eighteenth century romanticism. Text: Beers, *A History of English Romanticism in the Eighteenth Century*.

313. THE ROMANTIC MOVEMENT II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature. Professor Searson and Associate Professor Conover.

This course continues throughout the Victorian period the work done in the preceding course. Text: Beers, *A History of English Romanticism in the Nineteenth Century*.

Entomology

Professor DEAN
Assistant Professor MERRILL
Assistant Professor SMITH

Associate Entomologist MCCOLLOCH
Assistant HAYES

In all courses a special effort is made to make the student realize that he is studying living things which form a part of his daily environment, and upon which his welfare in many cases vitally depends. In courses in which both class and laboratory instruction is given, the closest correlation is striven for, and wherever possible the same form is studied simultaneously in laboratory and class. The student is led to integrate his classroom knowledge with local animal life by means of frequent and carefully planned field excursions and by the free use of vivaria in laboratory and museum. The courses offered are intended to awaken in the student a keen appreciation of the general principles underlying insect life, of the life economy of the more beneficial as well as the more injurious species, and of the general principles governing methods for their control.

Standard anatomical charts, a representative collection (especially of local species), a high-grade lantern for the projection of lantern and microscope slides, a large and excellent series of lantern slides (many of them colored), and a series of microscope slides are available for illustration. Compound and dissecting microscopes sufficient for the needs of laboratory classes have been provided.

Facilities for advanced work are provided for graduate students and others who expect to pursue the subject professionally. An advanced laboratory is equipped with individual desks, binocular microscopes, compound microscopes, rotary microtome, imbedded ovens, drawing apparatus, and a supply of glassware and reagents sufficient for histological work and for research. A well-equipped insectary is available for training in insectary methods. An air-conditioning machine in the insectary adds materially to the possibilities for experimental work. A field station with all the necessary equipment provides means for the study of insects under normal field conditions.

COURSES IN ENTOMOLOGY

FOR UNDERGRADUATES

101. GENERAL ENTOMOLOGY. Junior year and elective, both semesters and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: General Zoölogy I and II. Professor Dean, Assistant Professor Smith.

This is a study of the elementary anatomy and physiology of insects, complete enough to give a thorough understanding of the life history

and habits of the most important species and the general principles upon which the control of these economic forms is based. It is a study of the more important general facts about insects as a class; the main characters of the different orders and groups; how they survive and multiply; and how the structure and habits of one group render it susceptible to certain measures of control, while in other groups entirely different measures are necessary. The class work consists of lectures and of text and special reference study.

106. **HOUSEHOLD ENTOMOLOGY.** Elective, first semester. Class work, two hours. Two semester credits. Prerequisites: General Zoölogy I and II. Professor Dean.

This is a study of the elementary structure and physiology of insects, complete enough to give a clear understanding of the life history, habits and methods of control of the principal insects injurious to house, garden, lawn, and human health. The course consists of reference study and a series of lectures.

111. **APICULTURE.** Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Entomology. Assistant Professor Merrill.

This course comprises a general study of the structure, life history, general behavior, activities, and products of the honeybee. Special attention is given to practical beekeeping, the best methods used among beekeepers being discussed. A study is made of bee diseases and of the standard methods to be used in their eradication and control. A study is also made of the relation of bees to agriculture and horticulture.

116. **MILLING ENTOMOLOGY.** Junior year, second semester. Class work, one hour. One semester credit. Professor Dean.

This is a study of the insect pests of flour mills, elevators, granaries, warehouses, and bakeries, and of the standard methods to be used in dealing with them. The course consists of lectures and special reference reading. Inspection trips are made to flour mills and warehouses.

FOR GRADUATES AND UNDERGRADUATES

201. **HORTICULTURAL ENTOMOLOGY.** Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: General Entomology. Assistant Professor Merrill.

This is a study of the most important insect pests of orchard, garden and forest, and of standard methods for controlling their ravages. The class work consists of lectures and the study of references.

206. **GENERAL ECONOMIC ENTOMOLOGY.** Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Entomology. Professor Dean.

This is a study of the life economy of the more important economic insects, of methods to be used in dealing with them, and of the literature of economic entomology. The student is made familiar with our present knowledge of the most important of our injurious insects, with the sources of economic literature, and with methods commonly used in the investigation of problems in economic entomology. The class work consists of lectures, and of text and special reference reading.

Laboratory.—The laboratory work consists of the formation and study of a collection of injurious insects, and in insect breeding. This work naturally involves much field study, in the course of which the student gains a first-hand acquaintance with the more important injurious insects at home in nature.

211. **INSECT MORPHOLOGY I.** Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Entomology. Assistant Professor Smith.

This course deals exclusively with the external anatomy of representative insects belonging to a number of orders. The types studied are selected so as to present the essentials of the structure of the exoskeleton and to afford a basis for the courses in taxonomy and for professional studies in hexapod morphology.

212. INSECT MORPHOLOGY II. Elective, first semester. Laboratory, nine hours. Three semester credits. Prerequisite: Insect Morphology I. Assistant Professor Smith.

This course is designed for those advanced students who desire more thorough preparation in the essentials of insect anatomy than is provided for in Insect Morphology I. More extensive studies of detailed external and internal anatomy are made and preparation is afforded for advanced work in taxonomy and research in morphology.

216. PRINCIPLES OF TAXONOMY. Elective, second semester. Lectures, one hour. One semester credit. Prerequisites: (1) For students taking Taxonomy of Insects I: General Entomology and Insect Morphology I. (2) For students taking Taxonomy of Vertebrates: General Zoölogy I and II. All students registering in either of the above-mentioned courses must also register for this course. Courses cannot be taken separately. Assistant Professor Smith.

This course of lectures deals with the fundamental principles of modern taxonomy. The following subjects are considered in detail: Systems of classification; terminology of taxonomic groups; criteria of species and genera, binomial nomenclature, pre-Linnæan and modern nomenclature; international code of zoölogical nomenclature, and other codes; law of priority; and modern tendencies in taxonomy.

217. TAXONOMY OF INSECTS I. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisites: General Entomology and Insect Morphology I. Students registering for this course must also register for the course in Principles of Taxonomy. Assistant Professor Smith.

This is a study of the general principles of the classification of representative insects. The purpose of the course is so to familiarize the student with the literature, methods and ideals of classification that he will be able to identify unknown forms and to pursue advanced taxonomic studies.

218. TAXONOMY OF INSECTS II. Elective, second semester. Laboratory, nine hours. Three semester credits. Prerequisite: Taxonomy I and Insect Morphology II. Assistant Professor Smith.

This course provides for a more comprehensive preparation in the field of insect taxonomy. At the discretion of the instructor, the work may be taken in such a way that either a broader acquaintance with insects and the principles of classification is afforded, or intensive work may be done on selected groups.

221. ADVANCED GENERAL ENTOMOLOGY. Elective, first semester. Class work, three hours. Three semester credits. The class work consists of lectures, assigned readings, and written reports. Prerequisite: General Entomology. Assistant Professor Smith.

The purpose of this course is to give the advanced student a comprehensive view of the broad biological aspect of the subject and an understanding of the relation of insects to the complex of environmental factors. The various subdivisions of entomology are correlated and used as a basis in the presentation of general principles as well as illustrating the problems of maintenance and the various ways in which insects have solved them. The course includes, in part, a detailed consideration of the following: Phylogeny of insects and their relatives; metamerism; reproduction; gynandromorphism; parthenogenesis; pædogensis; polyem-

bryony; respiration; temperature; embryology; internal and external metamorphosis; metabolism; aquatic insects, their evolution, adaptations, and activities; regeneration; experimental work with insects; insect parasitism; color and coloration; insects in relation to other organisms; insect behavior; and geological and geographical distribution.

226. MEDICAL ENTOMOLOGY. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Entomology. Assistant Professor Smith.

The subject matter of this course deals with insects and other arthropods as transmitters and disseminators of disease, attention being confined to that phase of the subject which pertains to the health of man. Emphasis is placed on the various important species of insects which are related to disease, the pathogenic organisms and their relation to insects, and the preventive measures which have, up to date, proved most effective. Some attention is also given to the important theories which underlie this subject and to important investigations in progress at the present time.

Laboratory.—The laboratory work consists of a careful study of insects and other arthropods which may affect the health of man directly, and of those which may be instrumental in the dissemination of disease; also a study of the causative organisms of certain insect-borne diseases and the methods by which these organisms are transmitted.

228. ADVANCED APICULTURE. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: The regular course in apiculture, Entomology 111 or its equivalent. Assistant Professor Merrill.

This course is a continuation of the regular course in apiculture. The primary object of this course is to make a detailed study of the principles of bee behavior, and how these are related to practices of good beekeeping, special attention being given to the different forms of the behavior exhibited by the bees throughout the different seasons of the year, and the beekeeping practices which should be adopted to conform to this behavior. Since it begins in the first semester, problems that apply particularly to that time of the year are taken up, such as preparation for wintering, feeding for winter, and winter protection. Observations are made on the merits and demerits of different systems of wintering. Extracting honey, preparing it for market, marketing, and other advanced subjects are studied.

230. INSECT HISTOLOGY. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: General Entomology and General Cytology. Assistant Professor Smith.

This course is designed primarily for students who expect to do technical work in entomology. The work of the laboratory consists of the application of those special methods of gross and microscopical technique which are applicable to insects; practice in the use of the various special methods of killing and fixing, clearing, sectioning, staining and mounting the various groups of insects and insect tissues afforded. A study of insect tissues constitutes an important part of the course. The lectures deal with the more general matters of technique and insect histology.

231. ENTOMOLOGICAL AND ZOÖLOGICAL LITERATURE. Elective, first semester. Lectures, one hour. One semester credit. Prerequisite: General Entomology. Assistant Professor Smith.

This course deals with the literature of entomology, special consideration being given to bibliographical works and their uses. Since the literature of entomology is, to a considerable extent, inseparably associated with that of zoölogy, the course is of equal importance to the students of both subjects. The course is designed primarily to meet the

needs of advanced undergraduates and graduate students who are beginning research work. General and special bibliographical sources, foreign and American scientific journals and serials, and the construction of special bibliographies according to approved methods constitute the chief subjects for consideration. All advanced students of entomology and zoölogy are expected to take this course.

236. ZOÖLOGY AND ENTOMOLOGY SEMINAR. Elective, both semesters. One two-hour session each week. One semester credit. Prerequisite: Consult seminar committee.

This course consists in the presentation of original investigations, reviews of papers appearing in current journals, summaries of recent advances in the various fields, and discussion of the various aspects of the fundamental problems of modern biology.

FOR GRADUATES

316. RESEARCH IN ENTOMOLOGY. Advanced students having sufficient fundamental training may, with the approval of the head of the department, undertake original investigation in one of the following fields of entomology: taxonomy, morphology, economic entomology. Such work is pursued under the direct supervision of some member of the departmental faculty and the final results may, if of sufficient merit, be used to fulfill the thesis requirement for the master's degree. The special student may, if willing and capable, be drawn into the research work of the Agricultural Experiment Station during the summer vacation and receive training in the investigation of economic problems. Prerequisites: (1) For research in taxonomy and morphology: General Entomology, Insect Morphology I, Taxonomy of Insects I, and Cytology. (2) For research in economic entomology: General Entomology, General Economic Entomology, Insect Morphology I, and Taxonomy of Insects I. Professor Dean, Assistant Professors Merrill and Smith, and Associate Entomologist McColloch.

Geology

Professor NABOURS*
Associate Professor NEWMAN

By use of abundant illustrative material, an effort is made to have the student realize that he is dealing with natural forces which intimately affect his own well-being and that of his fellows. The agencies that have made the earth what it is are observed and studied in the field. The purpose of these courses is to arouse in the student an appreciation of the general principles underlying the structure and formation of the earth.

Some charts, a series of lantern slides, a representative collection of fossils and minerals, and a surrounding country exhibiting considerable variety of hill and valley, limestone, glacial drift and sand dunes, are available for illustrative purposes.

* Absent on leave, 1919-'20.

COURSES IN GEOLOGY

FOR UNDERGRADUATES

101. DYNAMIC AND STRUCTURAL GEOLOGY. Elective, first semester. Class work, two hours; two field trips during the semester. Two semester credits. Professor Nabours.

This course consists of a brief study of the structure of the earth, and of the agencies by which rocks are formed or destroyed and the topographic features of the earth produced. Text: *Introductory Geology*, by Chamberlain and Salisbury.

102. ENGINEERING GEOLOGY. Junior year and elective, second semester. Class work, two hours; laboratory, six hours. Four semester credits. Professor Nabours and Associate Professor Newman.

The class work consists of a study of the general principles of structural and dynamic geology, and of rocks in respect to their mineral composition, structural properties, changes in weathering, etc. It is given by lectures, textbooks and references.

Laboratory.—The laboratory work comprises the observation and description of such structural and dynamic features as the locality affords, and a study of the principal rocks and their mineral constituents.

FOR GRADUATES AND UNDERGRADUATES

201. HISTORICAL GEOLOGY. Elective, second semester. Class work, two hours; two field trips during the semester. Two semester credits. Prerequisites: Geology 101, Elementary Zoölogy, and General Botany, or equivalent. Professor Nabours.

This course takes up a brief study of the history of the earth as shown by the record in the rocks. Special emphasis is placed on the history of life as indicated by the fossils.

History and Civics

Professor PRICE
Associate Professor ILES
Associate Professor JAMES

Assistant Professor PEINE
Instructor OREM

Training for citizenship, breadth of view, historic-mindedness, fairness of judgment and general culture are constant and specific aims of each course offered by the Department of History and Civics. As a result of the training received in these courses the student is better prepared to understand and appreciate the institutions in the midst of which he lives and of which he is a part. He is also prepared to act more wisely his part as a leader in good citizenship wherever his lot may be cast. In our modern age and self-governing nation, and in an institution supported by the State and Nation, it would seem to be the imperative duty of every student to secure specific training for wise and effective leadership in the governmental affairs of the State and Nation that are thus preparing him for life and its duties.

COURSES IN HISTORY

FOR UNDERGRADUATES

101. AMERICAN HISTORY I (*or* BEGINNINGS OF THE AMERICAN NATION). Junior and senior years, both semesters and summer school. Class work, three hours. Three semester credits. Professor Price.

This course gives special emphasis to the industrial phases of the origin and development of American nationality and democracy to the

end of the War of 1812. It also includes our constitutional and political development, especially with reference to origin, basis, cause, and effect. It aims to develop historic-mindedness; that is, training the student to put himself in the other fellow's place and understand fairly "the why." The European origin and background of American history, the evolution of colonial life, industries, and institutions; why we became an independent nation; our westward expansion; the establishing of nationality, and the development of government by the people, are phases definitely emphasized. Instruction is given by means of lectures, readings, and recitations, based on *An American History Notebook*, by R. R. Price.

103. AMERICAN HISTORY LECTURES. Elective, both semesters and summer school. Two one-hour lectures a week. No credit. No prerequisite. Professor Price.

This series of lectures follows the outline given in *An American History Notebook*, which is used as the basis for the work in American History I, American History II, and American History III. Therefore this course is directly helpful to students taking any one of the three courses named above. To students taking only one of the above-named courses, these lectures give some insight as to the content of the other two courses. Since *An American History Notebook* has been adopted by the State Textbook Commission for use in the schools of the State, these lectures are also directly helpful for any student who expects to teach American history either in the grades or in high school. Only those who are regularly assigned to this course are permitted to attend the lectures; and when the student is assigned, regular attendance is required. There are no recitations and no examinations connected with this course. Students are permitted to ask questions at the close of each lecture. The course is based on Price's *An American History Notebook*.

105. AMERICAN INDUSTRIAL HISTORY. Sophomore and senior years, both semesters and summer school. Class work, three hours. Three semester credits. Assistant Professor Peine.

This course traces the history of American agriculture, manufactures, and commerce with related activities from their colonial beginnings to the present. It includes a survey of the physical basis for American history, the growth of population and its expansion across the continent, and the reflection of these things on our industrial, social and political life. European developments, especially the industrial revolution and the expansion of commerce, are studied for the light they throw on American history. Finally, throughout the course an attempt is made to trace the growth of our national industrial organization and its present-day aspects. This course is based on *Outlines of American Industrial History*, prepared by the department. A text, such as Coman's *Industrial History of the United States* or Bogart's *Economic History of the United States*, is required, and the student is held responsible (a) for the contents of his text and (b) for assigned library work and lectures.

121. ENGLISH HISTORY. Sophomore year, both semesters and summer school. Class work, three hours. Three semester credits. Not open for credit to students who offer English history for entrance; such students should take History 226 or some other three-hour College course in history. Associate Professor James.

This is a general survey of the whole field of English history with some emphasis on the modern period. It includes the outlines of political history and the essentials of English constitutional development. Special attention is given to the development of the empire, to the English background of American history, and to the industrial and social development of the English people. The work is based on Cheyney's *Short History of England*, with lectures and assigned readings.

123. HISTORY OF WESTERN EUROPE. Elective, second semester. Class work, three hours. Three semester credits. Assistant Professor Peine.

This is a general course in the history of Europe from the fall of Rome to the end of the Napoleonic era. It includes a study of medieval institutions, the rise of towns and commerce, the development of western nations, the Renaissance and the Reformation, the commercial and industrial revolution, and the expansion of Europe, and closes with a survey of France in the eighteenth century, the French Revolution, and the age of Napoleon. The work is based on a standard text with lectures and assigned readings.

126. CURRENT HISTORY. Freshman year, both semesters and summer school. Class work, one hour. One credit each semester. Open as elective for not to exceed a total of four semester credits. Associate Professor James.

The content of this course differs each semester from that of any other semester. The text for the course is a good weekly magazine, such as *The Independent* or *The Outlook*; but this is supplemented by such monthly periodicals as *The Review of Reviews*, *Current History*, and *World's Work*, together with the daily papers and some library references. The course is so conducted as to give a wide outlook on the world of to-day, and a better understanding of the conditions and institutions in the midst of which we live. It includes a study of as much of the everyday essentials of American and foreign governments, of international relations, of international law, of biography, of industrial developments, and of history—suggested each week by the events of the week—as can be crowded into the one hour of the recitation period. It directs the student to good habits of news reading of the right sort.

127. TEACHERS' COURSE IN HISTORY. Elective, summer school. Class work, four hours. Two semester credits. Associate Professor Iles.

This is a seminar course of discussion based on Henry Johnson's *Teaching of History in Elementary and Secondary Schools*, together with Mace's revised work, *Method in History*, and supplemented by a study of the Report of the Committee of Seven, and of the Committee of Five on *History in the Secondary Schools*, and the Committee of Eight on *History in the Elementary Schools*. A critical examination is made of special books on methods in history and civics, such as Wayland's *How to Teach American History*, and of special articles in the *History Teachers' Magazine*. The different texts in history and civics are critically investigated as to points of excellence or weakness, including lectures on the content or viewpoint of each. Information is also given as to the best illustrative material and helps in the teaching of history and civics. The course reveals the evolution in the writing of history, and the growing importance of history and civics in the modern school curriculum, together with the improving viewpoint as to content of both the history and the civics courses.

FOR GRADUATES AND UNDERGRADUATES

202. AMERICAN HISTORY II (or WESTWARD EXPANSION AND SECTIONALISM). Elective, both semesters and summer school. Class work, three hours. Three semester credits. Professor Price.

This course concerns itself with the industrial conditions, the issues and the leaders of the middle period of our history, from the close of the War of 1812 to the Civil War. Among the subjects investigated are the industrial and political conditions in America in 1816; the Missouri Compromise; the antislavery agitation; the Webster-Hayne debate; South Carolina nullification; annexation of Louisiana, Florida, and especially Texas; the Mexican War, and the resulting preponderance of the slavery issue; the Compromise of 1850; the Kansas-Nebraska bill and the early Kansas struggle "to the stars through difficulties," including the various constitutions and the final admission to statehood; the origin of the Republican party; the election of 1860; and the events leading immediately to the secession of the Southern States. Instruc-

tion is by means of lectures, recitations, and readings, based on *An American History Notebook*, by R. R. Price.

203. AMERICAN HISTORY III (or THE NEW INDUSTRIAL AGE). Elective, second semester and summer school. Class work, three hours. Three semester credits. Professor Price.

This course opens with a review of the industrial conditions in America just before the Civil War; next a careful examination is made of the industrial effects of that war; finally a study of the political and constitutional history of the last half-century is made in the light of the industrial conditions and developments of the same period. Manufactures, commerce, and especially agriculture, are carefully examined, particularly with reference to the South and West. The new developments in political parties and the new devices in self-government are carefully studied as to developments, cause, and present conditions. The new America, with its spirit of nationality, its emphatic self-government, and its new world power and responsibility, are studied especially in the light of the new industrial developments. Instruction is imparted by lectures, recitations, assigned readings, and special reports.

204. AMERICAN AGRICULTURAL HISTORY. Elective, first semester and summer school. Class work, three hours. Three semester credits. Professor Price.

This course is intended primarily for students in the Division of Agriculture. It devotes itself chiefly to the history of American agriculture. The course starts with a study of European background and Indian beginnings. It traces and compares the agricultural development of New England, the South and the central colonies during the colonial period; then follows the westward movement into the prairie regions of the Mississippi valley, with the distinctive American developments in methods, live stock, and especially farm machinery. The course gives special consideration to the South with its cotton, to the Northwest with its wheat, to the Southwest with its live stock, and to the corn belt with its varied industries. A special study is made of the last quarter-century, when varied industries, more intensive farming and the high cost of living are replacing extensive mining of the soil, with its remarkable era of low cost of living, its sudden accumulation of wealth, and its rapid development of civilization. The relation of all this to our own State is constantly kept in view. This course should be supplemented by the course in American Political History. Instruction is given by lectures and recitations, readings and reports.

206. AMERICAN POLITICAL HISTORY. Elective, first semester. Class work, two hours. Two semester credits. This course is especially intended to supplement course 204 or course 105; it is not open for credit to students who have credit in course 202. Associate Professor Iles.

This course gives the story of the origin, development, leaders and function of political parties in America, and studies the issues and results of the more important presidential elections. It traces the growth of nationality and the development of self-government through American history, but with special reference to present tendencies. This is a very desirable course for any one who would understand and appreciate present political and governmental conditions and tendencies.

207. PAN-AMERICA. Elective, first semester. Class work, two hours. Two semester credits. Associate Professor James.

The history, government, and industrial conditions of Canada, Mexico, and the South American nations, and the interrelations of each of these and the United States are studied in this course.

223. MODERN EUROPE (SINCE 1814). Sophomore and junior years and elective, both semesters and summer school. Class work, three hours. Three semester credits. Associate Professor Iles.

This course traces the evolution of the modern European nations since 1814, with special attention to political organization, industrial development, and colonial expansion. Political problems and social and economic adjustments due to the Great War are included. Recitations, lectures, and assigned readings. Text: Hayes's *A Political and Social History of Modern Europe*, Vol. II., with special studies on the World War.

225. HISTORY OF THE HOME. Elective, second semester. Class work, three hours. Three semester credits. Miss Orem.

This course includes the history of the primitive family; the Hebrew family; the family life of the Greeks and of the Romans; and the history of the home and family during the Middle Ages, including the influence of the Christian church. Next the history of the English family in the seventeenth and eighteenth centuries and of the American colonial home is studied. This is followed by a study of the industrial revolution and its effects upon family life. Finally, the history of the family during the nineteenth century, the present situation and tendencies are examined. The course is based primarily on Goodsell's *History of the Family*, supplemented by lectures and special studies.

226. MODERN ENGLAND AND THE BRITISH EMPIRE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Entrance credit in English history or three hours College credit in history, preferably History 121. Associate Professor James.

This course begins approximately with the accession of the Tudors in 1485. Special emphasis is placed on the beginnings and growth of world empire, England's part in international affairs, the economic and social history of the British Islands, and the changes by which England's government has become a practical democracy. The work closes with a survey of England and her empire as they exist to-day with their part in the World War. The course is based on Cross's *History of England and Greater Britain*, with lectures, assigned readings, and reports.

228. IMMIGRATION AND INTERNATIONAL RELATIONS. Elective, second semester. Class work, two hours. Two semester credits. Professor Price.

The title of the course suggests its content. It includes a study of the causes and the effects—economic, social, and political—of the coming of the foreigner to our shores, including the colonial period, the middle period, and the period since our Civil War, with special reference to the recent changes both as to character of the immigrants and the conditions in America. The text for this part of the course is Fairchild's *Immigration—A World Movement and Its American Significance*. The second part of the course is covered by lectures and assigned readings and reports. The text for the second part of the course is Latane's *From Isolation to Leadership*.

COURSES IN CIVICS

FOR UNDERGRADUATES

151. AMERICAN GOVERNMENT. Junior and senior years, both semesters and summer school. Class work, three hours. Three semester credits. Associate Professor Iles.

This course in civics, or actual government, reviews definitely the fundamental principles and operations of our state and national governments, including the essential principles of constitutional law, but gives special emphasis to the actual present-day conditions and movements in our governmental and political life. Among the subjects especially studied are the initiative and referendum, suffrage and primary elections, the recall, city government and government of territories, the regulation of commerce, conservation of national resources, national defense, taxation and finance, the actual methods of congressional activity, and the

function, organization, power, and importance of political parties in our government. The course is primarily based on Beard's *American Government and Politics*. Throughout this course special and definite attention is given to recent and current events in governmental activities.

152. COMMUNITY CIVICS. Elective, summer school. Class work, four hours. Two semester credits. Another hour of credit may be obtained by a limited number of students who have time to devote to special problems. Associate Professor Iles.

This course deals chiefly with the functions of government as manifested in community life. It is designed to afford a basis both in subject matter and in method for those teachers who desire to present civics in direct relation to individual welfare. The use of local material in teaching civics is illustrated and the structural side of government is reviewed as far as is necessary to show the means through which the functions are performed.

153. BUSINESS LAW I. All years, both semesters. Class work, one hour. One semester credit. Assistant Professor Peine.

This course includes a careful study of the essential principles in the law of contracts, of sales, and of negotiable instruments. It should be followed by Business Law II. Text: Huffcut's *Elements of Business Law*.

154. BUSINESS LAW II. Elective, both semesters. Class work, one hour. One semester credit. Prerequisite: Business Law I. Assistant Professor Peine.

This course includes a careful study of the more fundamental principles of the law of agency, of insurance, of guarantee and damages; of partnership and corporations; of bailments, including common carriers; of torts, especially the law of negligence; and of patent rights. Text: Huffcut's *Elements of Business Law*, and the *Kansas Statutes*.

155. FARM LAW. Elective, both semesters. Class work, two hours. Two semester credits. Assistant Professor Peine.

This course outlines the following subjects as far as the time permits: *First*. The title to the farm—deeds, etc.; boundaries of the farm—fences, etc.; water rights, including irrigation; police power of the State—quarantine, destruction of diseased animals, pure food; live stock—liability of owner, trespassing animals, estrays. *Second*. Contracts, including hired help, etc.; farm crops and their ownership; renters; sales, including warranty, etc.; factors, or commission merchants; common carriers, such as railroads; insurance. The course is based on Bay's *Business Law*, supplemented by Green's *Law for the American Farmer*, and by the *Kansas Statutes*.

FOR GRADUATES AND UNDERGRADUATES

252. COMPARATIVE GOVERNMENT. Elective, first semester. Class work, two hours. Two semester credits. Associate Professor Iles.

This course comprises a study of the leading features, especially with regard to administration, of certain European governments such as England, France, and Germany, and a comparison of essential features with government in the United States. It is planned to supplement and round out the course in American Government. Text: Macy and Gannaway's *Comparative Free Government* or Holt's *Introduction to the Study of Government*.

Industrial Journalism and Printing

Professor CRAWFORD
Associate Professor ROGERS

Assistant Professor KEITH
Instructor POLSON

The work in industrial journalism and printing is designed to accomplish two purposes: the preparation of students who expect to be leaders in industrial, economic, and social life to do occasional writing for newspapers and other periodicals on subjects of special interest; and the training of students fundamentally interested in journalism for positions on farm journals, newspapers and other publications, particularly where writing on agriculture and other industrial subjects is in demand. The instruction given in the courses considers the requirements of newspapers, agricultural papers, trade publications, and general magazines. The work comprises lectures, discussions, and practice. *The Kansas Industrialist*, the official paper of the College, is under the editorial and mechanical direction of the professor of industrial journalism and superintendent of printing. In it is published acceptable matter prepared by students. The office of *The Kansas State Collegian*, the student semi-weekly newspaper, is in the department practice room. Students write also for general newspapers, farm journals, and other publications.

Attention is given to the mechanical side of the profession in the instruction in printing, two semesters of which are required of all students taking the curriculum in industrial journalism. Printing has been taught in the institution continuously since 1875—the longest period during which the instruction in the subject has been given in any American college. Practical work is done not only on *The Kansas Industrialist*, but in a wide variety of job printing for College departments.

The equipment for instruction in journalism and printing is that of a practical publishing and printing plant. The journalism work room contains typewriters, reference books, "morgue," and files of a large number of agricultural publications, newspapers, and trade journals.

The printing plant contains a linotype, a two-revolution cylinder press, a drum-cylinder press, three platen presses, two wire-stitching machines, two paper cutters, a folding machine, an interchangeable perforating and punching machine, a quantity of both display and body type, including some of the most modern faces, and a large amount of miscellaneous equipment. All power machines are driven by individual electric motors.

A large amount of timely agricultural and other information is furnished regularly to Kansas newspapers, farm journals, and other publications. Special assignments are covered for these periodicals, and special inquiries are answered.

COURSES IN INDUSTRIAL JOURNALISM AND PRINTING

FOR UNDERGRADUATES

101. PRINCIPLES OF TYPOGRAPHY I. Freshman year, first semester. Class work, two hours; laboratory practice, three hours. Three semester credits. Assistant Professor Keith.

The course comprises a study of the case, the point system, and the measurement of type and stock. The history of printing is presented

and a study is made of the development of the various typographical styles. Practice is given in setting straight matter. Emphasis is laid on accuracy.

104. **PRINCIPLES OF TYPOGRAPHY II.** Freshman year, second semester. Class work, two hours; laboratory practice, three hours. Three semester credits. Assistant Professor Keith.

The work of the preceding course is continued, a study being made of type faces and the typography of advertisements and head display. The principles of effective make-up are treated. The use of cost systems in printing offices receives attention.

107. **ELEMENTARY JOURNALISM.** Sophomore year, both semesters. Class work, two hours. Two semester credits. Miss Polson.

The course is intended to give the student practical experience in the fundamentals of news writing. Methods of obtaining news of various types, the writing of the lead, and the general style of the news story are carefully considered.

113. **INDUSTRIAL WRITING.** Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Elementary Journalism. Miss Polson.

This course applies the principles of journalism to the treatment of industrial subjects, such as are found in agriculture, engineering, home economics, and more general scientific research. The work of the College and the Experiment Stations affords the basis for the study and practice.

121. **AGRICULTURAL JOURNALISM.** Junior year, both semesters. Class work, one hour. One semester credit. Associate Professor Rogers.

The course is intended to supply students in the course in agriculture with sufficient knowledge of the principles of news writing, as applied to agriculture, to enable them to become occasional contributors to newspapers and farm journals. Much practice in agricultural writing is given in the course.

123. **INDUSTRIAL FEATURE WRITING.** Junior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Industrial Writing. Associate Professor Rogers.

This course takes up the feature story, with careful attention to both the informative and the entertaining type. The principles underlying the feature story are applied to writing on agricultural and other industrial subjects. The demands of newspapers, farm journals, and general magazines for writing of this character are analyzed.

125. **PRINCIPLES OF ADVERTISING.** Junior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Industrial Feature Writing. Professor Davis of the Department of English.

This course considers the fundamentals of advertising as a part of modern business. The study of the goods to be advertised, the analysis of the market, the psychology of advertising, the preparation of advertising copy, and other important matters are taken up. The student is required to make application of the principles brought out in the course.

130. **TECHNICAL JOURNALISM** Junior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Industrial Feature Writing. Associate Professor Rogers.

The course deals specifically with agricultural journals, trade journals, and other publications of highly specialized character. The writing which is done in the course is done for publications of these types, and the students are required to submit their material to editors. A beginning is made in the study of the desk work required on a technical journal, including the handling of copy, the use of illustrations, and the principles of make-up from the editorial standpoint.

110, 116, 127, 133. JOURNALISM PRACTICE I, II, III, IV. These courses comprise laboratory practice accompanying courses 107, 113, 123, 130. Sophomore and junior years. Six hours. Two semester credits for each course. Prerequisite for each semester is the work of all preceding semesters in Journalism Practice. Professor Crawford, Associate Professor Rogers and Miss Polson.

The work in Journalism Practice follows closely the other courses in journalism with which it is taken. Students are required to gather news, both assigned and unassigned, and to write the stories in the department workroom. The College campus is divided into "runs," which the students must cover at regular intervals, and assignments are given at specific times. The work given is suited to the advancement of the student. As he progresses in his work he is required not only to obtain news and feature stories, but to edit copy, to read proof, to write heads, to prepare editorials, to select matter worthy of reprint, and to perform other duties required in newspaper and magazine offices. Emphasis is laid on popular treatment of industrial subjects. The instructor in charge gives the students training in looking up references and in handling technical subjects simply but accurately, and also makes specific criticism on the work done by the students.

FOR GRADUATES AND UNDERGRADUATES

201. CIRCULATION AND ADVERTISING PROMOTION. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Technical Journalism. Professor Crawford.

This course deals with the business management of periodical publications. The building up of circulation and the soliciting of advertising receive special emphasis. Premiums and other plans for increasing circulation are discussed. The advertising agency, the circulation analysis, and the fixing of advertising rates are treated.

204. COPY READING. Senior year, first semester. Laboratory practice, six hours. Two semester credits. Prerequisite: Technical Journalism. Associate Professor Rogers.

The course continues the work begun in Technical Journalism, and gives practice in the work required of the copy reader, whether on a newspaper, an agricultural journal or some other publication. A study is made of newspaper style and of magazine and book style, the distinction between the two being clearly pointed out. The writing of heads and titles and proof reading receive detailed attention. A large amount of copy is actually handled in class, and papers of various types are made up as practice assignments.

207. EDITORIAL PRACTICE. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Copy Reading. Professor Crawford.

The course deals not only with the writing of editorials suitable for farm papers, trade papers, and newspapers, but with the conduct of the editorial offices of a periodical publication. Students obtain instruction and practice in writing the matter commonly prepared by the editorial staff of a paper, including editorials, paragraphs, and exchange matter. The acceptance and rejection of contributions receive consideration. Editorial policies and their influence form the subject of careful discussion.

210. ETHICS OF JOURNALISM. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Circulation and Advertising Promotion. Professor Crawford.

The course treats ethics of journalism as exemplified in the use of contributed matter, in the work of the reporter or staff writer, in the editorial conduct of the paper, and in the handling of circulation and advertising. The federal and state laws relating to periodical publications,

to advertising, to libel, and to authors' rights, including the federal law of copyright, are treated. The attitude of periodical publications on matters of ethics and law is observed at first hand by the students.

212. **PRINTING COST ACCOUNTING.** Elective, second semester, on permission of the instructor. Class work, two hours. Two semester credits. Assistant Professor Keith.

Cost-finding systems adapted to various sizes and kinds of printing plants are studied in detail in this course. The figuring of costs, the economical routing of work through the plant, the purchase of stock and other supplies, and other problems of management are treated. All books and records commonly kept in printing offices are studied.

213. **MATERIALS OF JOURNALISM.** Elective, first semester. Class work, two hours. Two semester credits. Miss Polson.

This is a course intended primarily for the general student who desires to obtain a knowledge of the principal newspapers and magazines, and to be able to form judgments as to the accuracy and adequacy of news reports and other published matter. The materials handled by the publications, the methods of treatment, and the character of the editorial comment are carefully presented. Attention is given to the several types of journalism.

216. **MAGAZINE FEATURES.** Elective, second semester, on permission of the instructor. Two semester credits. Miss Polson.

The course is intended for advanced students who desire to prepare literary work suitable for publication in magazines. The matter of the courses is varied to suit the needs and desires of the students, emphasis being laid upon such types of magazine writing as members of the class wish to practice.

219. **HISTORY OF JOURNALISM.** Elective, first semester. Class work, two hours. Two semester credits. Professor Crawford.

The course deals with the history of journalism from its beginning and with the history of printing so far as this is concerned with periodical publications. Most of the time of this course is given to journalism in England, Canada and the United States, though some attention is given to publications of other countries. The differentiation of journalism in the nineteenth century, and the several types which arose because of this are the subjects of careful study. Particular attention is given to the fields of agricultural and trade journalism.

222. **JOURNALISM SURVEYS.** Elective, second semester. Laboratory work, six hours. Two semester credits. Professor Crawford.

This course comprises the careful investigation of the periodical reading matter of communities. The information obtained is carefully tabulated, and studies are made of the relation of the reading matter to the industrial, economic, social, and moral life of the communities.

225. **CURRENT PERIODICALS.** Elective, first semester. Class work, two hours. Two semester credits. Professor Crawford.

The course comprises a study of current periodicals of various types. Special emphasis is laid on the material that they contain and the nature of its appeal to the reader. It is a nontechnical course, intended to give general students some knowledge of the field of current periodical literature.

227. **JOURNALISM FOR VOCATIONAL TEACHERS.** Elective, summer school. Class work, four hours. Two semester credits. Associate Professor Rogers.

This course is offered to meet the demand of teachers who feel the need of special training in news gathering and editing to enable them to use

effective publicity in connection with the work of their schools. How to write, edit, and publish a school paper, and how to write school news that will be acceptable to local papers, are taken up in the course. Several hundred newspapers and magazines received by the Department of Industrial Journalism afford practical news material. Careful attention is given to the publication of high-school papers, and problems of staff organization, editorial methods, business management, mechanical make-up, and faculty advice are discussed. A large number of high-school publications are available for use by students in the course. Actual practice on a model school paper is required of each student taking the work.

FOR GRADUATES

Special courses will be arranged to meet the specific needs and desires of individual graduate students. These courses will in general embody creative literary work or detailed research in specialized journalism.

Library Economy

Librarian SMITH
Associate Librarian DERBY

Reference Assistant HEDRICK
Reference Assistant SANKEE

The Library supplements the work of every department of the College. It is a storehouse of knowledge for every student. It supplies information and the latest results of scientific research for every instructor. The library is thus essential to the College, forming, as it were, a center from which its various activities radiate.

In order that the Library may perform its functions with the highest degree of efficiency it is necessary that instruction be given regarding its use. With this thought in mind a course is offered the purpose of which is to familiarize the student with scientific, up-to-date methods in the use of books and to acquaint him with the best general reference books as well as with standard works on various subjects. Placed at the beginning of his College course it should tend to increase largely his efficiency in study throughout the entire course.

COURSE IN LIBRARY ECONOMY

FOR UNDERGRADUATES

101. LIBRARY METHODS. Freshman year, both semesters. Class work, one hour. One semester credit. Associate Librarian Derby, Miss Hedrick, and Miss Sankee.

The course consists of lectures on classification and arrangement of books in the Library; card catalogues; the principal works of reference, such as dictionaries, encyclopedias, atlases, and standard works in history, literature, economics, quotations, statistics, etc.; public documents and their indexes; indexes to periodicals, etc. Instruction is given, also, in methods of indexing current reading for purposes of future reference.

Mathematics

Professor REMICK
Professor WHITE
Associate Professor STRATTON

Assistant Professor FEHN
Instructor HOLROYD
Instructor MCKITTRICK

In an institution that stands as an exponent of the industrial type of education, mathematics should occupy an important place. Training in the exact science is valuable not only for its own sake but also on account of its manifold applications. On this basis the courses in mathematics are offered primarily with the following ends in view: (1) the attainment of mental power and accuracy in the interest both of general culture and special application; (2) the acquirement of facts and processes that will provide the student with an indispensable tool for further scientific and technical study.

COURSES IN MATHEMATICS

FOR UNDERGRADUATES

101. PLANE TRIGONOMETRY Freshman year, first and second semesters. Class work, three hours. Three semester credits. Prerequisites: Plane geometry and one and one-half years of high-school algebra. Professor Remick, Professor White, Associate Professor Stratton, Assistant Professor Fehn, Miss Holroyd, and Miss McKittrick.

This course treats of the functions of acute angles, right triangles, goniometry, oblique triangles, practical problems. Text: Palmer and Leigh's *Plane and Spherical Trigonometry*

104. COLLEGE ALGEBRA Freshman year, both semesters. Class work, three hours. Three semester credits. Prerequisites: Plane geometry and one and one-half years of high-school algebra. Professor Remick, Professor White, Associate Professor Stratton, Assistant Professor Fehn, Miss Holroyd, and Miss McKittrick.

Elementary topics, functions and their graphs, quadratic equations are rapidly reviewed. The further treatment includes the subjects of complex numbers, theory of equations, permutations and combinations, partial fractions, logarithms, and determinants. Text: Rietz and Crathorne's *College Algebra*.

107. COLLEGE ALGEBRA A. Freshman year, second semester. Class work, five hours. Five semester credits. Prerequisites: Plane geometry and one year of high-school algebra. Professor Remick, Professor White, Associate Professor Stratton, Assistant Professor Fehn, Miss Holroyd, and Miss McKittrick.

After a brief review of elementary subjects, a thorough treatment of quadratics, ratio, proportion, progressions, and the binomial theorem for positive exponents is given. The remainder of the course follows closely the chief content of course 104. Text: Rietz and Crathorne's *College Algebra*.

110. PLANE ANALYTICAL GEOMETRY. Sophomore year, first semester. Class work, four hours. Four semester credits. Prerequisites: Plane Trigonometry and College Algebra. Professor White, Associate Professor Stratton, and Assistant Professor Fehn.

This course treats of coordinate systems, projections, loci, straight line, conics, parametric and empirical equations, with a discussion of the general equation of the second degree. Text: Tanner and Allen's *Brief Course in Analytical Geometry*.

113. CALCULUS I. Sophomore year, second semester. Class work, five hours. Five semester credits. Prerequisite: Plane Analytical Geometry. Professors Remick and White and Associate Professor Stratton.

The usual topics of differential calculus are considered together with integration of standard forms, definite integrals, rational fractions, and integration by parts. This course contains problems closely related to the work of engineering students. Text: Phillip's *Differential and Integral Calculus*.

116. CALCULUS II. Junior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus I. Professors Remick and White and Associate Professor Stratton.

In this division of the subject emphasis is laid upon the applied side. Problems involving areas, lengths, surfaces, and volumes are treated by processes of single integration. The idea of successive and partial integration is applied to areas, moments, centers of gravity, surfaces, volumes, etc. The types of differential equations which the student of engineering is most likely to meet with in his subsequent work are briefly discussed. Text: Phillip's *Differential and Integral Calculus*.

119. CALCULUS. Sophomore year and elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Analytical Geometry. Professors Remick and White.

This course is designed especially for students intending to teach secondary mathematics and for those interested in the natural sciences. It includes a brief treatment of the fundamental principles of both branches of calculus, practice with the standard formulas of differentiation and their application to geometry and mechanics. Integration of the usual elementary forms is followed by the idea of the definite integral and a few of the more important applications.

122. SPECIAL METHODS IN THE TEACHING OF MATHEMATICS. Elective, second semester. Class work, three hours. Three semester credits. Associate Professor Stratton.

As its name indicates, this course is intended primarily for those who are planning to teach elementary mathematics. Emphasis is given to pedagogical questions, with some reference to the historical course of development. A discussion of the best methods of teaching arithmetic, algebra, and geometry; a study of the report of prominent mathematical organizations, especially those of the international commission; a comparison of the curricula of different schools—these are some of the matters which receive attention. An examination is made of books and articles on the teaching of mathematics. The course proceeds by lectures, readings, and reports on assigned topics.

125. ANALYSIS OF STATISTICS. Elective, first semester. Class work, three hours. Three semester credits. Professor Remick and Associate Professor Stratton.

The special purpose of this course is to acquaint students of agriculture, who may have occasion to make use of statistical tables of various sorts, with the modern mathematical methods of treatment. Use is made of farm bulletins, agricultural reports, etc., by means of lectures, readings, and recitations.

128. MATHEMATICS OF BIOLOGY. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Analytical Geometry. Professor Remick.

Elements of differential and integral calculus, curve plotting, and determination of equations of curves, are here considered. The course is designed to meet the needs of students in biology and is taught largely by the lecture method.

131. INSTITUTIONAL ACCOUNTING. Elective, second semester. Class work, three hours. Three semester credits. Associate Professor Stratton.

This course treats of accounting for institutions such as colleges, schools, clubs, societies, industrial and social organizations. The practice work includes preparation for publication of statements of income and expenditure, balance sheets, treasurer's reports, financial data and statistics, and of the annual returns of net income required under the federal income-tax law. A study is made of the mathematics of investments, the handling of endowment and trust funds, and the preparation of budgets. The work proceeds by lectures, discussions, written reports, and exercises.

134. ACCOUNTING PRACTICE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Elementary Book-keeping. Associate Professor Stratton.

This course includes an analysis of the development and structure of bookkeeping methods, the accounts of single proprietors, partnerships and corporations, the construction of manufacturing and trading profit-and-loss accounts and balance sheets, the analysis of railroad reports and bank statements, including bankruptcy and receivership conditions. The course is designed to give the students power to analyze commercial accounts and statements.

FOR GRADUATES AND UNDERGRADUATES

201. DIFFERENTIAL EQUATIONS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus II. Professor Remick.

This course is designed for those who may wish to extend their study of mathematics beyond the usual first course in calculus, and also for those intending to take advanced work in physics, mechanics, or engineering. The various standard types of differential equations are considered, together with the usual applications. Text: Murray's *Differential Equations*.

204. METHOD OF LEAST SQUARES AND THEORY OF MEASUREMENT. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Calculus II. Professors Remick and White.

This course includes a study of the law of error based on the theory of probability and the probability curve; adjustments of observations by the method of least squares; development of precision measures; distribution of errors; and Gauss's method of substitution in the solution of normal equations. The solution of a number of problems is required.

207. SOLID ANALYTICAL GEOMETRY. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Plane Analytical Geometry and Calculus II. Professor White.

The topics treated include coördinates of points in space and their transformations, and involve the usual discussion of lines and planes. The standard types of quadratic surfaces are considered together with their classification and principal properties. Text: Snyder and Sisam's *Analytical Geometry of Space*.

210. ADVANCED CALCULUS I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus II. Professor White.

This course considers primarily special topics in integral calculus, including various methods of integrating elementary forms, a discussion of definite integrals with attention to the gamma and beta functions, and applications to lengths and areas. Text: Byerly's *Integral Calculus*.

213. ADVANCED CALCULUS II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Advanced Calculus I. Professor White.

This is a continuation of course 210, including further applications to geometry and mechanics, a treatment of line, surface, and space integrals, and a discussion of elliptic integrals. Text: Byerly's *Integral Calculus*.

216. THEORY OF EQUATIONS. Elective, first semester. Class work, three hours. Three semester credits. Professor Remick.

The course presupposes familiarity with the elements of the classical theory of the subject and treats particularly the modern development based upon the ideas connected with substitution groups and leading to the discussion of the solution of the general algebraic equation from the standpoint of the Galois theory. Text: Cajori's *Modern Theory of Equations*.

FOR GRADUATES

301. THEORY OF FUNCTIONS OF A COMPLEX VARIABLE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Advanced Calculus II and Differential Equations. Professor Remick.

The usual line of topics is treated through lectures, discussions, and reports.

306. THEORETICAL MECHANICS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus II. Associate Professor Stratton.

It is assumed that the student entering upon this course is familiar with certain preliminary ideas found in textbooks on general physics, and the subject of mechanics is treated in its relation to mathematical analysis.

311. PROJECTIVE GEOMETRY. Elective, second semester. Class work, three hours. Three semester credits. Professor White.

This course includes a treatment of the fundamental forms, projective relations, point rows, and pencils of the second order, poles and polars, properties of conics, and involution.

Military Training

FREDERICK B. TERRELL (Captain Inf., U. S. A.), Professor of Military Science and Tactics, Commandant of Cadets

LEWIS C. DAVIDSON (Captain Inf., U. S. A.), Associate Professor of Military Science and Tactics

EDWARD L. CLAEREN (Formerly Major, U. S. A.), Secretary

FRANK CUMISKEY (First Sergeant Inf., U. S. A.), Instructor

ARTHUR H. LENZ* (First Sergeant Inf., U. S. A.), Instructor

F. L. STEINER† (First Sergeant Inf., U. S. A.), Instructor

Since this College is one of the beneficiaries of the act of Congress of 1862, military tactics is required in the College curricula. All young men of age, not physically disqualified, are required to take military training four full hours a week for two years. A student entering as a junior or above is held for military science for the time necessary to complete the remainder of his College course unless this period is reduced by credits accepted from another institution.

Requests for excuse from military science, or for postponement of the work, are acted upon by the President of the College. Such requests

* Resigned, March 14, 1920.

† Beginning March 22, 1920.

are presented through the student's dean, and the President obtains the advice of the commandant of cadets, who thoroughly investigates each case on its merits and makes his recommendation to the President. Requests based on physical condition must be accompanied by a recommendation made by the College physician. Students excused from military science on account of physical disability are assigned to an equivalent amount of some other College work instead. Students permitted to postpone military science for any reason are not thereby excused, but must make it up later.

The act of Congress of June 3, 1916, known as the national defense act, provides for the establishment in civil institutions of a Reserve Officers' Training Corps (R. O. T. C.).

The object of this provision is stated as follows:

"The primary object of establishing units of the Reserve Officers' Training Corps is to qualify, by systematic and standard methods of training, students at civil institutions for reserve officers. The system of instruction, herein prescribed presents to these students a standard measure of that military training which is necessary in order to prepare them to perform intelligently the duties of commissioned officers in the military forces of the United States, and it enables them to be thus trained with the least practicable interference with their civil careers.

"Units of the senior division may be organized at civil institutions which require four years of collegiate study for a degree, including State universities and those State institutions that are required to provide instruction in military tactics under the provisions of the act of Congress approved July 2, 1862, donating lands for the establishment of colleges where the leading object shall be practical instruction in agriculture and the mechanic arts, including military tactics.

"Units of the junior division may be organized at any other public or private educational institution."

An infantry unit of the Reserve Officers' Training Corps has been established in this College, the senior division consisting of men in the four years' College curricula and the School of Agriculture.

Members of the R. O. T. C. will receive the benefits mentioned below:

1. SENIOR DIVISION, BASIC COURSE (Freshman, Sophomores, and School of Agriculture). Each student of these classes will be furnished with complete uniform, and equipment for his use during the course. The articles remain the property of the United States and must be accounted for and turned in by each student at the close of each college year.

2. SENIOR DIVISION, ADVANCED COURSE (students who have a credit for two years Basic Course). The student who continues in the R. O. T. C. after completing the Basic Course will receive the following benefits:

He will receive the uniform referred to above, on the same terms.

He will receive commutation of subsistence at the rate of 40 cents per day, provided he executes an agreement to complete the Advanced Course, or continue in the course during the remainder of his time in College, and to take the course in camp training during such period, prescribed by the Secretary of War. The camps referred to involve no expense on the part of the student. In addition, a complete summer uniform will be issued.

After graduation he will be eligible for appointment by the President of the United States as a reserve officer of the Army, and if so appointed he may, under certain conditions, be appointed and commissioned as a temporary second lieutenant in the regular army for a period of six months, with pay at the rate of \$100 per month, with the usual allowances.

In order to elect the Advanced Course, R. O. T. C., a student must have the recommendation of the President of the College and the Professor of Military Science and Tactics.

The corps of cadets at present is organized as two battalions of infantry, four companies. A military band is also provided for, the members of which must be thoroughly trained in military tactics. Assignments to the military band are made upon recommendation of the bandmaster, who has charge of the technical instruction.

Officers and noncommissioned officers are selected from the students taking the Advanced Course, R. O. T. C., by the commandant of cadets, with the approval of the President of the College. This selection is made from among those cadets who have been most studious and soldierlike in the performance of their duties, and the most exemplary in their general deportment. Commissions are given all officers, and these commissions are signed by the governor, the secretary of state and the adjutant-general of the Kansas National Guard, while warrants signed by the President of the College and the Commandant of Cadets are issued to the noncommissioned officers. Both are held during the good conduct of the recipient.

Students who are regularly enrolled in the advanced course of the senior division receive three semester credits of elective work toward graduation for each semester of military training taken beyond the basic course.

COURSES IN MILITARY TRAINING

Senior Division, R. O. T. C.

BASIC COURSES

101. MILITARY SCIENCE I. Freshman year, first semester. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: None.

The work of this course is divided as follows:

(a) *Practical.* Physical drill; infantry drill; school of the soldier, squad and company in close and extended order; preliminary instruction, sighting, position and aiming drills, gallery practice, nomenclature and care of rifle and equipment.

(b) *Theoretical.* Theory of target practice (individual and collective), military organization; map reading; service of security; personal hygiene.

102. MILITARY SCIENCE II. Freshman year, second semester. Lectures, recitations and military drill, four hours a week. One semester credit. Prerequisite: Military Science I.

The work of this course is divided as follows:

(a) *Practical.* Physical drill; infantry drill; school of the battalion; ceremonies; manuals; bayonet combat; entrenchment; first-aid instruction; range and gallery practice.

(b) *Theoretical*. Lectures on military policy as shown by military history of the United States, and military obligation of citizenship; service of information; combat; Infantry Drill Regulations, to include the school of the company; camp sanitation for small commands.

103. MILITARY SCIENCE III. Sophomore year, first semester. Lectures, recitations and military drill, four hours a week. One semester credit. Prerequisite: Military Science II.

The work of this course is divided as follows:

(a) *Practical*. Same as 102 (a); combat firing.

(b) *Theoretical*. Infantry Drill Regulations, to include the school of the battalion and combat; Small Arms Firing Regulations; lectures as in 102 (b); map reading; camp sanitation and camping expedients.

104. MILITARY SCIENCE IV. Sophomore year, second semester. Lectures, recitations and military drill, four hours a week. One semester credit. Prerequisite: Military Science III.

The work of this course is divided as follows:

(a) *Practical*. The same as 102 (a); signaling; semaphore and first-aid; sand-table work; range practice.

(b) *Theoretical*. Lectures on recent military history; service of information and security; marches and camping.

ADVANCED COURSES

109. MILITARY SCIENCE V. Junior year, first semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisites: Military Science IV.

This course is divided into—

(a) *Practical*. Duties consistent with rank of cadet officers or non-commissioned officers in connection with courses 101, 102, 103, and 104; military sketching; discipline and handling of men.

(b) *Theoretical*. Minor tactics; field orders; map maneuvers. Liaison, topography, military engineering.

110. MILITARY SCIENCE VI. Junior year, second semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisite: Military Science V.

The course is divided into—

(a) *Practical*. Same as course 105 (a).

(b) *Theoretical*. Minor tactics; map maneuvers continued; elements of international law; military law; sanitation.

111. MILITARY SCIENCE VII. Senior year, first semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisite: Military Science VI.

The course is divided into—

(a) *Practical*. Same as course 105 (a).

(b) *Theoretical*. Tactical problems; map maneuvers; proceedings of court-martial; gradual growth of principles of international law embodied in American diplomacy, legislation and treaties; psychology of war and kindred subjects; general principles of strategy to show relations between the statesman and the soldier; military engineering; company administration.

112. MILITARY SCIENCE VIII. Senior year, second semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisite: Military Science VII.

The course is divided into—

(a) *Practical*. Same as course 105 (a).

(b) *Theoretical*. Tactical problems; map maneuvers; rifle in war; lectures on military history and policy; orders and messages; tactical walks; military history.

Modern Languages

Professor CORTELYOU
Assistant Professor LIMPER
Assistant HESSE

The study of modern foreign languages serves a number of purposes. It gives the student general training and culture; it throws helpful side lights upon English, his mother tongue; and it gives him important aid in scientific research. It is desired that the instruction in modern languages here given be as practical as possible, without, however, failing to encourage an appreciation of modern foreign literature. The plan of instruction in general is a combination of the grammatical and conversational methods, each of which has its own special advantages.

A realization of the growing importance of our relations to Spanish-speaking peoples has lead to the introduction of Spanish courses, which may be taken as electives.

A number of literary and scientific periodicals published in French, Spanish, and German are received by the College Library, and afford the student excellent opportunity to amplify his reading knowledge of these languages.

Students who have had French, Spanish, or German in high school are required, as a rule, to take more advanced courses as their elective or required work in that language.

COURSES IN GERMAN

FOR UNDERGRADUATES

101. GERMAN I. Elective, first semester. Class work, three hours. Three semester credits. No prerequisite. Professor Cortelyou.

After two periods given to the acquisition of the sounds of the German letters, the student at once begins reading. Vocabularies are learned from the outset, while grammar is acquired gradually with the reading. Oral and written work and simple conversational exercises begin with the first reading lesson. In the work of this course there are included the study of articles, declensions of nouns and pronouns, the indicative mode of weak verbs, sentence order, and the comparison of adjectives. Frequent reviews enable the student to digest the facts presented, while the abundant conversation and written work subserves the same end. Text: Vos's *Essentials of German* (first eighteen lessons).

102. GERMAN II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: German I, or its equivalent. Professor Cortelyou.

Students are repeatedly drilled on the grammatical constructions already emphasized in German I, of which this course is a continuation. The remaining important grammar points are studied. The general plan of the work is the same as in course 101. Essential facts of grammar are insisted upon, but German is taught as a living language. Written translations from English into German are frequent. Text: Vos's *Essentials of German* (completed).

103. BEGINNING GERMAN I. Junior year and elective, first semester. Class work, five hours. Five semester credits. Professor Cortelyou.

The greater part of the grammar is taken up in this course. The work includes a study of articles, pronouns, nouns, numerals, sentence order, conjugation of verbs throughout the active voice, and adjective declen-

sions and comparison. Translations of English into German as well as German into English are frequent. Text: Vos's *Essentials of German* (first twenty-seven lessons).

104. BEGINNING GERMAN II. Junior year and elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Beginning German I, or one year of high-school German. Professor Cortelyou.

The study of grammar is finished, special stress being put upon forms and uses of the subjunctive, forms of the passive voice, substitutions for the passive, mixed verbs, and modal auxiliaries. Grammar points of course 103 are constantly reviewed. Some sight reading and composition work is done. Text: Vos's *Essentials of German* (Lesson twenty-eight to the end).

111. GERMAN READINGS. Junior year and elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: Beginning German I, or one year of high-school German. Professor Cortelyou.

This course embraces readings of easy, idiomatic selections from modern authors. Grammatical drill is continued. German conversations based on the texts read are frequent. Text: *Aehrenlese*, by Bierwirth and Herrick.

FOR GRADUATES AND UNDERGRADUATES

201. GERMAN SHORT STORIES. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: Course 111. Given in the year 1919-'20 and alternate years thereafter. Professor Cortelyou.

The material read in this course comprises a number of short stories of considerable interest, by such modern authors as Auerbach, Niese, Goldhammer, La Roche, Leander, Scheffel, and Polenz. Text: Baker's *German Stories*.

206. GERMAN COMEDIES. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: Course 111. Given in the year 1920-'21 and alternate years thereafter. Professor Cortelyou.

The course comprises the reading of recent one-act comedies of literary merit, and of a realistic, lively, and cleanly humorous nature, including the following: Julius Rosen's *Ein Knopf*, Gustav von Moser's *Ein amerikanisches Duell*, Hugo Mueller's *Im Wartesalon erster Klasse*, and Emil Pohl's *Die Schulreiterin*. Exercises in conversation and sight reading are occasionally introduced. Text: Manley and Allen's *Four German Comedies*.

216. GERMAN HISTORICAL PROSE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Not given in the year 1919-'20. Professor Cortelyou.

In this course an insight is obtained of the Prussian government, administration of justice, military system, economic development, and strivings toward national unity as they existed at the time of Frederick the Great. Text: Rogge's *Der grosse Preussenkoenig*, edited by Adams.

221. GERMAN PROSE I. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Given in the year 1920-'21 and alternate years thereafter. Professor Cortelyou.

This is a practical course designed to give the student an intimate knowledge of everyday German as used among the Germans in their varied activities. The following are studied in this course: visits; the various stores; restaurants, meals, and expressions used at table; boarding houses and hotels; the family, weddings, marriages, etc.; dress; the school system; religion and church life; divisions of society; occupations; money, measures, and weights; festivities; traveling; the postal system, the telegraph, the telephone; the city in general; Berlin and cities of the provinces; the country; the German empire; the military system; con-

versational phrases; the best German; everyday German. There are occasional sight translations, and some conversational work is done. Text: Kron's *German Daily Life*.

226. GERMAN CLASSICS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Course 216, 221, or 231. Given in the year 1919-'20 and alternate years thereafter. Professor Cortelyou.

This is a course introductory to a study of the German classics. Two or three of the simpler works of classic authors, such as Lessing's *Minna von Barnhelm* and Goethe's *Hermann und Dorothea*, are translated in the work of this term. Textbooks: Lessing's *Minna von Barnhelm*, edited by von Minckwitz and Wilder, and Goethe's *Hermann und Dorothea*, edited by Allen.

231. GERMAN PROSE II. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Given in the year 1920-'21 and alternate years thereafter. Professor Cortelyou.

This course is designed to give the student facility in the rapid translation of fairly easy prose. A number of modern short stories are read. Besides the more formal work, there are sight translations of easy selections. Text: Allen and Batt's *Easy German Stories*, Vols. I and II.

236. SCIENTIFIC GERMAN I. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: Course 102 or 103. Professor Cortelyou.

This course is designed as an introduction to the vast field of scientific publications appearing in German. It consists chiefly in translating miscellaneous scientific articles, especially those dealing with chemistry and physics. Text: Dippold's *Scientific German Reader*.

241. SCIENTIFIC GERMAN II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 236. Professor Cortelyou.

This is a continuation of the preceding course. The material studied is of a more general nature than in course 236. Text: Greenfield's *Technical and Scientific German*.

COURSES IN FRENCH

FOR UNDERGRADUATES

151. FRENCH I. Sophomore year and elective, both semesters and summer school. Class work, three hours. Three semester credits. Assistant Professor Limper and Miss Hesse.

The phonetic symbols being a great help in the acquisition of accurate pronunciation, the first two days are devoted to learning these symbols and a number of useful expressions in French. The recitations are conducted largely in French and considerable time is devoted to conversation. Nevertheless, conversation is considered merely a means to the acquisition of a reading knowledge of French. The fundamentals of grammar are covered in this course and reading matter in the grammar is supplemented by a reader. Texts: Olmsted's *Elementary French Grammar* (first twenty-two lessons) and Allen and Schoell's *French Life* (thirty pages).

152. FRENCH II. Sophomore year and elective, both semesters and summer school. Class work, three hours. Three semester credits. Prerequisite: French I, or one year of high-school French. Assistant Professor Limper and Miss Hesse.

This course is a continuation of French I. The grammar is completed, special attention being given to irregular verbs. Reading and conversation are continued throughout the course. Students who have

had one year of French in high school begin with this course. Texts: Olmsted's *Elementary French Grammar* (Lesson XXII to the end) and Allen and Schoell's *French Life*.

153. BEGINNING FRENCH I. Junior year and elective, both semesters. Class work, five hours. Five semester credits. Assistant Professor Limper and Miss Hesse.

From the start great care is taken in acquiring correct pronunciation. The larger part of the grammar is covered in this course. Considerable time is devoted to oral and written work and to conversation. Easy readings are taken up. Texts: Olmsted's *Elementary French Grammar* (first thirty-seven lessons) and Allen and Schoell's *French Life*.

154. BEGINNING FRENCH II. Junior year and elective, both semesters. Class work, five hours. Five semester credits. Prerequisite: Beginning French I, or one year of high-school French. Assistant Professor Limper and Miss Hesse.

This course is a continuation of Beginning French I. The grammar is completed, especial attention being given to irregular verbs. The grammar points of the preceding course are reviewed and considerable time is devoted to conversation. Much reading is done, the purpose being to enlarge the student's vocabulary. Texts: Olmsted's *Elementary French Grammar* (Lesson XXXVIII to the end); Fontaine's *En France* and one other short reading text.

161. FRENCH READINGS. Elective, first semester and summer school. Class work, three hours. Three semester credits. Not to be taken by students who have had course 154. Prerequisite: French II. Assistant Professor Limper and Miss Hesse.

This is essentially a reading course, the purpose being to enlarge the student's vocabulary. Grammar is reviewed and considerable time is devoted to conversation. Fontaine's *En France* and one other short French text are read.

FOR GRADUATES AND UNDERGRADUATES

251. FRENCH SHORT STORIES. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 154 or 161. Assistant Professor Limper and Miss Hesse.

The purpose of this course is to introduce the student to modern French literature. The modern short story, since it covers so large a range of subjects, also offers excellent material for the enlargement of the vocabulary. Stories by such writers as Daudet, Maupassant, and Zola are read. Text: Buffum's *French Short Stories*.

270. TEACHERS' COURSE IN FRENCH. Elective, second semester and summer school. Class work, three hours. Three semester credits. Prerequisite: Consult the instructor. Assistant Professor Limper.

The subject matter of this course falls under four heads, namely: pronunciation, grammar, reading material, and work outside of the regular curriculum. Under the first heading, the anatomical basis for the production of the sounds peculiar to the French language are treated. Under the second heading not only are methods of presenting grammar dealt with, but a thorough and systematic review of the subject is included. The third division consists of a careful examination of the various reading texts used in the State. Under the fourth heading, methods of conducting a *Cercle français* and material to be used in it are treated.

COURSES IN SPANISH

FOR UNDERGRADUATES

176. SPANISH I. Elective, first semester and summer school. Class work, three hours. Three semester credits. Assistant Professor Limper and Miss Hesse.

In this course nouns, adjectives, pronouns, demonstratives, and numerals are treated and the indicative of verbs is studied. The course is largely conducted in Spanish, the student gradually acquiring a fair-sized and practical vocabulary. Text: Hill and Ford's *First Spanish Course* (first thirty-one lessons).

177. SPANISH II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Spanish I, or one year of high-school Spanish. Miss Hesse.

In addition to study of grammar, which is here completed, considerable reading is done. Stress is laid upon training the ear to understand spoken Spanish. Texts: Hills and Ford's *First Spanish Course* (completed), and Bergé-Soler and Hatheway's *Elementary Spanish-American Reader*

180. SPANISH READINGS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Spanish II. Miss Hesse.

A thorough study is made of one or two of the best works in Spanish literature from the more modern writers. One hour a week is devoted entirely to conversation and composition, the subjects being taken from current topics of the day.

183. COMMERCIAL SPANISH. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Spanish II. Miss Hesse.

This course is intended to equip the student with a commercial vocabulary and with the elements indispensable to success, especially necessary if he should pursue his business in Latin-American countries. Text: McHale's *Commercial Spanish*.

Music

Professor WESTBROOK
Instructor SMITH
Instructor KIMMEL
Instructor BUGBEY
Instructor CURRY
Instructor LEFFLER

Instructor LOVEJOY
Instructor WHEELER
Instructor HANNEN
Instructor BRAZLETON
Instructor LING
Miss HUGHES

The aim of the Department of Music is, to be of vital value in the life of every student. The department strives to create and foster a love and appreciation for the best in music and to give to students that broader culture and more complete education which is gained through academic and professional and vocational training combined with musical and artistic study. Believing that this can be accomplished to a much greater degree by having artistic performers among us, courses are offered which will prepare those who so desire to be efficient in some chosen musical line. Students enrolled in the department participate in the musical contributions to the public programs of the College, and such participation is a part of their training and duty.

METHODS OF INSTRUCTION

Instruction in voice and instrumental music is given in private lessons. No two students have the same mental, physical or artistic capacity, and their individual capabilities can be neither properly nor fully developed without painstaking personal attention. The best results are dependent on a close adaptation to the individual needs of the pupils, and this, of course, cannot be gained in classes, as is the case in the individual lessons. The effectiveness of the methods used is demonstrated by the interest and progress of the pupils.

All theoretical work is taught in classes. These and other classes in the Department of Music are free to any student in the institution.

CREDITS

Students taking work in the Department of Music are allowed credits on their work in the Divisions of General Science, Home Economics, and Agriculture, while substitutions in music, with the approval of the Dean, may be made in the Division of Engineering, as follows: For Voice or some instrument, two hours each semester; for Musical History, two hours each semester; for Harmony, two hours each semester; for Counterpoint, Musical Form and Musical Analysis, two hours each semester; for Chorus, Orchestra or Band, one hour each semester; for Public School Music Methods, two hours each semester. Any student having a full assignment may, upon recommendation of the Director of Music together with the approval of the student's Dean, take music without credit.

Students coming from other schools to enter our courses in music may be sufficiently advanced as players or singers to enter the second or third year of the regular music curricula but prohibited therefrom owing to their lack of knowledge of theory. If such students enter the first year of the theoretical course, their progress as players and singers is not retarded, but it would be much to their advantage to make special theoretical preparation in the hope of qualifying for more advanced standing.

CURRICULUM LEADING TO THE DEGREE OF BACHELOR OF MUSIC

In addition to the requirements outlined below, a high-school education or its equivalent is necessary for a degree.

For entrance to the vocal course leading to a degree, the candidate for admission shall furnish proof that he has completed grades one and two of the high-school vocal course and grades one and two of the high-school piano course, or their equivalent, as outlined by the Kansas State Music Teachers' Association.

For entrance to the piano or organ course leading to a degree, the candidate for admission shall furnish proof that he has completed grades one to six, inclusive, of the high-school piano course, or its equivalent, as outlined by the Kansas State Music Teachers' Association.

For entrance to the violin course leading to a degree, the candidate for admission shall furnish proof that he has completed grades one to

six, inclusive, of the high-school violin course, or its equivalent, as outlined by the Kansas State Music Teachers' Association.

The Director of the Department of Music, together with the instructor with whom the candidate chooses to study voice or his chosen instrument, shall decide whether or not the candidate for admission can musically qualify for admission as a freshman in this course. Those who cannot qualify musically may enter upon their theoretical and collegiate subjects, but will be considered preparatory students in their chosen instrument until, in the judgment of the instructor and the Director of the Department of Music, the student may be classified in this course. As to the length of time it takes to complete this course satisfactorily, much depends upon the natural ability of the pupil, the intensity of his application, and the time he spends in developing the art of his particular instrument.

Outline of Curriculum of Music Leading to the Degree of Bachelor of Music

FIRST YEAR

FIRST SEMESTER:

Voice or some instrument. Two lessons a week. Two credits.
 Harmony I. Two one-hour recitations a week. Two credits.
 Ear Training and Sight Singing I. Two one-hour recitations a week.
 Musical Appreciation I. One one-hour recitation a week. One credit.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying.
 One credit.
 College Rhetoric I. Three one-hour recitations a week. Three credits.
 Physical Education.

SECOND SEMESTER:

Voice or some instrument. Two lessons a week. Two credits.
 Harmony II. Two one-hour recitations a week. Two credits.
 Ear Training and Sight Singing II. Two one-hour recitations a week.
 Two credits.
 Musical Appreciation II. One one-hour recitation a week. One credit.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying.
 One credit.
 College Rhetoric II. Three one-hour recitations a week. Three credits.
 Harmonics. Two one-hour recitations a week. Two credits.
 Physical Education.

SECOND YEAR

FIRST SEMESTER:

Voice or some instrument. Two lessons a week. Two credits.
 Harmony III. Two one-hour recitations a week. Two credits.
 Musical History I. Two one-hour recitations a week. Two credits.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying.
 One credit.
 Recital.
 German I. Three one-hour recitations a week. Three credits.
 Physical Education.

SECOND SEMESTER:

Voice or some instrument. Two lessons a week. Two credits.
 Harmony IV. Two one-hour recitations a week. Two credits.
 Musical History II. Two one-hour recitations a week. Two credits.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying.
 One credit.
 Recital.
 German II. Three one-hour recitations a week. Three credits.
 Physical Education.

THIRD YEAR

FIRST SEMESTER:

Voice or some instrument. Two lessons a week. Two credits.
 Counterpoint. Two one-hour recitations a week. Two credits.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying.
 One credit.
 Recital.
 Practice Teaching I.
 Psychology. Three one-hour recitations a week. Three credits.

SECOND SEMESTER:

Voice or some instrument. Two lessons a week. Two credits.
 Musical Form and Musical Analysis. Two one-hour recitations a week.
 Two credits.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying.
 One credit.
 Recital.
 Practice Teaching II.
 Educational Psychology. Three one-hour recitations a week. Three credits.

FOURTH YEAR

FIRST SEMESTER:

Voice or some instrument. Two private lessons a week.
 Musical Theory I. (Composition, orchestration, and conducting.) Two
 one-hour recitations a week.
 Ensemble. Choral Society, orchestra, band, glee club or accompanying.
 One credit.
 Recital.
 French I. Three one-hour recitations a week. Three credits.
 English Literature I. Four one-hour recitations a week. Four credits.

SECOND SEMESTER:

Voice or some instrument. Two private lessons a week.
 Musical Theory II. (Composition, orchestration, and conducting). Two
 one-hour recitations a week.
 Ensemble. Choral Society, orchestra, band, glee club or accompanying.
 French II. Three one-hour recitations a week. Three credits.
 Recital.

Vocal students must offer, in addition to the course as outlined above, eight credits in piano.

Students of piano, violin, organ, etc., must offer four credits in either voice or some instrument other than their major subject.

Upon the approval of the Dean of the Division of General Science and the Director of the Department of Music, substitutes in collegiate subjects such as German, English, etc., as outlined above, may be made, these substitutes to be made in literary lines.

The degree of bachelor of music is conferred upon students who complete the curriculum in music as outlined in the foregoing statement.

In addition to the course as outlined, students should elect a sufficient number of hours in the Department of Education, so that in addition to receiving the degree of bachelor of music they may also receive from the State Board of Education a teachers' certificate which will allow them to teach in the high schools of the State.

CURRICULUM IN APPLIED MUSIC

By applied music is meant the practical and scientific study of voice, piano, violin, violoncello, organ or some band instrument in private, individual lessons, together with the study of theoretical subjects in classes. This curriculum is designed to fit students not only to be soloists but also to be efficient teachers of music.

The curriculum in applied music is the same as the first three years of the preceding curriculum (the curriculum leading to a degree in music) as outlined above.

A certificate is awarded to students who complete the curriculum in applied music. A high school education or its equivalent is a prerequisite to the awarding of the certificate. Those not qualified to take up the curriculum in applied music are considered as preparatory students until, in the judgment of the Director of the Department of Music, their work justifies a change in classification. Each candidate for a certificate must give a public recital some time during the second semester of his third year.

CURRICULUM IN PUBLIC-SCHOOL MUSIC

For those wishing to prepare themselves to teach music in the public schools a curriculum in public-school music, as outlined below, has been prepared. The completion of a four-year high-school course or its equivalent is required before entering on the work here outlined. To those satisfactorily completing this curriculum a State teachers' certificate in music is granted.

Outline of Curriculum in Public-school Music**FIRST YEAR****FIRST SEMESTER:**

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods I. Two semester credits.
 Harmony I. Two semester credits.
 Ear Training and Sight Singing I. Two semester credits.
 Psychology. Three semester credits.
 Chorus. One semester credit.
 Musical Appreciation I. One semester credit.
 College Rhetoric I. Three semester credits.
 Physical Education.

SECOND SEMESTER:

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods II. Two semester credits.
 Harmony II. Two semester credits.
 Ear Training and Sight Singing II. Two semester credits.
 Chorus. One semester credit.
 Musical Appreciation II. One semester credit.
 Methods in Teaching. Three semester credits.
 College Rhetoric II. Three semester credits.
 Physical Education.

SECOND YEAR

FIRST SEMESTER:

- Voice. Two lessons a week. Two semester credits.
- Piano. One lesson a week. One semester credit.
- School Music Methods III. Two semester credits.
- Harmony III. Two semester credits.
- Chorus. One semester credit.
- Musical History I. Two semester credits.
- Educational Administration. Three semester credits.
- French I. Three semester credits.
- Physical Education.

SECOND SEMESTER:

- Voice. Two lessons a week. Two semester credits.
- Piano. One lesson a week. One semester credit.
- School Music Methods IV. Two semester credits.
- Harmony IV. Two semester credits.
- Chorus. One semester credit.
- Musical History II. Two semester credits.
- French II. Three semester credits.
- American Literature. Three semester credits.
- Physical Education.

THEORETICAL COURSES IN MUSIC

The aim of theoretical courses is primarily to give the student an intelligent conception of music as a science, and give him such working knowledge of the material of music as will fit him for intelligent appreciation, criticism and interpretation; and secondarily, to form a broad foundation for later study in composition.

101, 102. HARMONY I AND II. Elective, beginning first semester and continuing throughout the year. Class work, two hours. Two semester credits for each course. Miss Bugbey.

This course consists of a study of the following: Scales and intervals; primary and secondary triads and their inversions; harmonizing of given basses and melodies; chords of the dominant seventh; secondary seventh chords; modulation; original work begun; ear training; key-board harmony.

103, 104. HARMONY III AND IV. Elective, beginning first semester and continuing throughout the year. Class work, two hours. Two semester credits for each course. Prerequisite: Harmony II. Miss Bugbey.

This course includes a study of the following: Modulations, continued; altered chords; suspensions; foreign tones; pedal points; figuration; accompaniments; original work; ear training; elementary harmonic analysis; elementary analysis of form.

105, 106. EAR-TRAINING AND SIGHT SINGING I AND II. Elective for all students; required with Harmony I and II for music students. Class work, two hours. No College credit, but required in the music curricula. Miss Bugbey.

This course is a study in reading and hearing intervals and chords.

107. COUNTERPOINT Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Harmony IV. Miss Bugbey.

The course in counterpoint consists of the study of simple counterpoint in two parts; first, second, third, fourth and fifth species, and florid counterpoint.

109. MUSICAL FORM AND MUSICAL ANALYSIS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisites: Harmony IV and Counterpoint. Miss Bugbey.

Chord reading and the accounting theoretically for every note in a piece of music, combined with analytical study of hymn tunes, preludes, inventions, and dance forms of Bach, small instrumental forms, song forms, sonata forms, cantata and oratorio forms are the substance of this course.

110, 111. HISTORY OF MUSIC I AND II. Elective, beginning first semester and continuing throughout the year. Students may enter at the beginning of either semester, however. Class work, two hours. Two semester credits for each course. Miss Bugbey.

A modern text forming the basis of this work is supplemented by lectures and library research. Time is given to the early and primitive development of the art, but special stress is laid upon the classical, Roman and modern periods, together with the present-day conditions and tendencies. In addition to theses upon the general historical and critical subjects, the class is also given practice in journalistic criticism of concert and recital performances.

115, 116. MUSICAL APPRECIATION I AND II. Elective. Class work, one hour. Students may enroll at the beginning of either semester. One semester credit for each course. Miss Bugbey.

Music is a language, and like language must be learned by hearing. As it is the sole design of this course to facilitate intelligent listening, the student's powers of imagination and observation are appealed to at once.

The work is presented in a nontechnical way, in the form of illustration from a talking machine. The subjects treated are melody, rhythm, form, cadence, classical and romantic ideals, present-day tendencies, songs, piano, violin, orchestra, band, chorus, opera, etc., and differences in concert and recital programs.

Several different hours are devoted to this work, so that many students may be accommodated at periods which will suit their convenience.

120, 121. SCHOOL MUSIC METHODS I AND II. First semester and continuing throughout the year. Lectures and research, three hours. Two semester credits for each course. Miss Hughes.

These courses deal with the place of music and the teacher in the school and in the community.

122, 123. SCHOOL MUSIC METHODS III AND IV. First and second semesters, respectively. Lectures, research, and practice teaching, three hours. Two semester credits for each course. Miss Hughes.

These courses are a continuation of School Music Methods I and II.

PRACTICAL COURSES IN MUSIC

130. VOICE. Two private lessons a week. Two semester credits. Elective in College curricula. Professor Westbrook, Miss Kimmell, and Mr. Lovejoy.

The course of instruction is based primarily upon the Italian school for training voices. Correct tone placement, so that the pupil produces tones throughout all registers with ease, and with firm, even quality, is the foundation of good singing. During the first year especial attention is given to a systematic course in breathing, tone placement and analysis of vowels and consonants relative to vocal needs. At all times attention is given to perfect enunciation, and German, French and Italian diction is taught in connection with actual song coaching. The song literature of America, England, Germany, France and Italy is studied, and a satisfactory performance of songs, oratorio or operatic arias from each one of these schools is necessary. Students specializing in voice in this course are expected to be or become able to play simple accompaniments.

135. VIOLIN. Two private lessons a week. Two semester credits. Elective in College curricula. Miss Hannen.

In this department the aim is to teach the fundamentals of violin playing in such a manner as to lay the foundation of intelligent musicianship. In this work, as in the other lines of musical endeavor, mastery of the instrument is a task which imposes different difficulties upon every student. Natural ability, physical characteristics and the general make-up of the individual so influence progress that no definite method of instruction can be outlined which can be profitably pursued by all players. However, particular attention is paid to the correct position of the student while playing, and also to the manner of holding the violin and bow. A graceful and natural method of playing is insisted upon, and great care is exercised to develop an accurate feeling for good intonation. Elementary scale work is begun at an early period and is gradually extended. Studies and exercises from the best writers are selected and, as the student develops, the entire field of violin literature is open for study.

Violoncello, viola and contrabass receive the same attention in this department as does the violin.

140. PIANO. Two private lessons a week. Two semester credits. Elective in College curricula. Misses Smith, Leffler, Ling, and Brazelton.

The methods of instruction in this department are direct and simple. Pupils are taught not only to play, but also to think logically according to the scientific principles of the art. Thus is developed definite and intelligent teaching ability as well as sound artistic performance. A technical foundation is the first requisite in modern piano playing. This is accomplished by a carefully selected and graded set of exercises and studies, designed to bring about that mental control of muscles without which artistic results cannot be obtained. Clearness of conception, distinctness of phrasing, variety of tone, good rhythm and technical accuracy are insisted upon. As the student advances, difficult compositions of both the classic and modern writers are studied. Interpretation becomes a special study, and all the emotional, intellectual and physical faculties are brought into that harmony and control which alone results in artistic performance. Opportunity is offered for study of accompaniments and piano ensemble.

145. WIND INSTRUMENTS. Two private lessons a week. Two semester credits. Elective in College curricula. Mr. Wheeler.

In this department opportunity is offered for the study of any wind instrument. Both the Albert and Boehm systems of clarinet playing are taught, while the semi-no-pressure system of cornet playing is used. In this as in other departments the work is taught beginning with elementary scale and technical study and extending over the more difficult literature written for wind instruments. Instruction in instrumentation, conducting and formation of bands is also given.

MUSICAL ORGANIZATIONS

Every voice and each instrument has a distinct function in the science of tonal expression, and only in the combination of voices and instruments are the finest effects in the coloring of melody, harmony and rhythm produced. This combination is made possible in the Department of Music by the number of students enrolled in the College and by the variety of ensemble organizations.

150. THE CHORAL SOCIETY. Throughout the year. Weekly rehearsals, all special rehearsals and public performances. One credit each semester.

This organization, which is conducted by Professor Westbrook, numbers about two hundred, and is one of the best student singing organizations in the West. The rehearsals are held Monday evening, weekly, and

part songs, madrigals, glees, cantatas, and the great oratorios are studied, and presented publicly with the assistance of the orchestra and visiting artist soloists.

151. **THE ORCHESTRA.** Regular rehearsals, all special rehearsals and public performances. One credit each semester.

The orchestra is conducted by Mr. Wheeler, teacher of stringed instruments. It is a definite organization wherein discipline prevails and permanent membership with regular attendance is insisted upon. This body maintains a correct and well-balanced instrumentation, containing all the instruments of the modern symphony orchestra. The work is highly educational, and offers in the preparation for concerts and performances with the choral society the actual experience and routine necessary for efficient orchestra playing. Membership is open to all in the College who are capable of playing acceptably.

152. **THE COLLEGE BAND.** Regular rehearsals, special rehearsals and public performances. One credit each semester.

Practice in the band may be accredited through the Department of Military Science in lieu of drill and theoretical instruction. The band furnishes music for all ceremonies of a military character and for various other College occasions.

THE APOLLO CLUB. The Apollo Club consists of about thirty of the best men's voices in the institution. The try-out for this singing body is held in the first semester of each year and the club is chosen from a large number seeking admission. A "waiting list" is maintained, and a place made vacant in the club by the dropping out of a member is immediately filled by one of this list.

The singing of the Apollo Club is characterized by striking vigor, spontaneity, clear enunciation, shading and color, all of which are vital elements in artistic singing. This organization is available for a limited number of concert engagements and recitals throughout the State. Mr. Lovejoy.

THE ST. CECILIA CLUB. This is a singing organization of young women, and is without doubt one of the finest organizations of its kind in the West. The voices are selected with the utmost care as to range, blending qualities and special adaptability to the work, thus securing an almost perfect ensemble. The St. Cecilia and Apollo clubs are combined for special choir singing. Mr. Lovejoy.

RECITALS AND CONCERTS

Unusual advantages for hearing good music are afforded at this institution. In addition to numerous choral, orchestra, band and glee-club concerts given, in which the leading soloists of the country are heard assisting, a number of great artists are brought to our College in the Artist Series Course and during Spring Festival Week. There are also numerous recitals by the members of the conservatory faculty and by students.

FEEES

For a semester of eighteen weeks:

| | |
|---|----------------------------|
| Voice, two lessons a week with the Director..... | \$38.00 |
| Voice, one lesson a week with the Director..... | 20.00 |
| Organ, band or orchestral instruments, two lessons a week with Mr. Wheeler..... | 28.00 |
| One lesson a week in same with Mr. Wheeler..... | 15.00 |
| Voice, violin or piano, two lessons a week, according to the teacher chosen | \$28.00, \$25.00, or 22.00 |
| One lesson a week in same, according to teacher chosen, | 15.00, 13.50, or 12.00 |
| Piano rent, one hour daily..... | 4.00 |

Physical Education and Athletics

Professor CLEVENGER
Assistant Professor SCHULZ*
Assistant Professor LORENZ

Instructor BOND
Assistant BARTHOLF
Assistant BLAIN

The purpose of this department is to assist the students of the College to live to the best advantage, and so to aid them in the formation of hygienic habits that during their College course they may make profitable physical preparation for life. It is an urgent necessity that each student have an intelligent appreciation of the means requisite for the preservation of his health, in order that he may be able to formulate intelligently his own policy of health control.

All young men and all young women of the College are entitled to the privileges of the gymnasium, which is one of the largest in the West and is well equipped with all sorts of apparatus for physical training, with lockers, plunge baths, shower baths, and other accommodations.

PHYSICAL EDUCATION FOR MEN

Physical education is required of all freshmen and sophomores unless excused for disability by the College physician. After completing the requirement, advanced work may be elected for a total of four hours of credit.

PHYSICAL EXAMINATIONS

The work of the department is based largely upon a physical examination given each student when he enters upon the work of the department. A second examination is given at the close of his first year. All students, whether taking work in the department or not, are entitled to receive a physical examination and advice as to their physical condition.

The measurements taken and the tests given have each a definite purpose with reference to ascertaining the muscular condition of the individual. A diagnosis is also made of the vital organs to ascertain their functional conditions, and a complete inspection of the whole body is made to detect any weakness or deformity that may exist. Based upon the information thus obtained, advice is given and work is assigned to students in accordance with their physical needs, tastes, and capabilities. Delicate students and those suffering from functional disorders receive individual attention. Students organically sound are assigned work in a carefully graded and progressive system of gymnastics and athletics. All candidates for athletic teams should enroll in the department, submit to a thorough physical examination, and pass the grade tests before being allowed to compete for positions on the various teams. Students engaging in two or more sports during the school year must undergo a physical examination preliminary to participation in each sport. This is required in order that no student may engage in athletics to his own permanent physical injury. Each student may secure a copy of his physical measurements, and an anthropometric chart, showing in graphic form his development as compared with that of the average man.

* Resigned, June 30, 1920

Members of the teams, reporting regularly, are excused from regular class work, and are entitled to full credit in that portion of their work; but before the completion of the course at least two semesters' work must be done in the gymnasium. Credit, the equivalent of a one-hour subject, is given and counts toward the College degree. The individual's grade rests largely on the basis of attendance, punctuality, earnestness, and application, but practical tests are also given.

Regulation uniforms must be worn in the gymnasium. Students are advised not to procure uniforms until after their arrival at the College.

Various grades of gymnastic and athletic exercises are offered by the department. The great variety of exercises offered is intended to meet all individual needs, capacities and tastes. A physical examination and test determines the grade or class of exercises for which a student is fitted.

COURSES IN PHYSICAL EDUCATION

103. PHYSICAL EDUCATION M-I. Freshman year, first semester. Two hours a week. Assistant Professor Lorenz.

Hygiene and social problems are discussed as an essential part of this course. This instruction gives an insight into the practical problems of daily healthy living from a personal point of view. Directions are given for avoiding the common ills of student life, and for maintaining the highest physical and mental condition while in College, as well as for gaining the highest development of vital power and health for future duties.

During the winter the practical work is conducted indoors, and consists of light and heavy gymnastics, which are selected with a view to obtaining progressive effect upon the bodily organism. During the fall a man may select Rugby football or soccer football. Beginning about December first the work consists of the following:

a. *Free Calisthenics.* Exercises are selected for their different effects upon the bodily organism, and are arranged in the order of increasing difficulty. They involve hygienic or body-building work, educative movement, and corrective or remedial exercise. Both the Swedish and the German systems are used.

b. *Light Apparatus.* Training is given in the use of Indian clubs, dumb-bells, wands, bar bells, etc.

c. *Heavy Apparatus.* Graded exercises are given on parallel bars, vaulting bars, bounce board and mat, side and long horse, high and low horizontal bars, traveling and flying rings, etc.

d. *Indoor Athletics.* Instruction is given in all indoor track events preparatory to indoor track meets.

e. *Games.* There are included basket ball, indoor baseball, volley ball; also other games of more recreative nature.

104. PHYSICAL EDUCATION M-II. Freshman year, second semester. Two hours a week. Assistant Professor Lorenz.

This course is a continuation of Physical Training M-I. Baseball, track and field athletics are given in the spring as soon as weather conditions permit outdoor work. A part of the regular instruction for the spring semester is in swimming. A passing grade must be made in this phase of the work also.

105. PHYSICAL EDUCATION M-III. Sophomore year, first semester. Two hours a week. Assistant Professor Lorenz.

This course is a continuation of Physical Education M-II. It is required of all young men of the sophomore class.

106. **PHYSICAL EDUCATION M-IV.** Sophomore year, second semester. Two hours a week. Assistant Professor Lorenz.

This course is a continuation of Physical Education M-III. It is required of all young men of the sophomore class.

110. **ADVANCED APPARATUS I.** Elective, first semester. Three hours a week. One semester credit. Assistant Professor Lorenz.

This course is open only to those men who show ability as gymnasts. From this class men are picked for the gymnastic team. Tumbling and work on the various pieces of apparatus are given.

111. **ADVANCED APPARATUS II.** Elective, second semester. Three hours a week. One semester credit. Assistant Professor Lorenz.

This is a continuation of Advanced Apparatus I.

120. **PHYSICAL TRAINING SPECIALTIES.** Under this head come fencing, boxing, wrestling, offered as advanced work to those who have had not less than two semesters of work in the gymnasium. Hours are arranged with the instructor.

126. **FOOTBALL.** Elective, summer school. Lectures and recitations, four hours. Two semester credits. Professor Clevenger.

This course covers the following phases: Spirit of the game, discussion of the rules, tackling the dummy, charging sled, defense in general, line defense, secondary defense, kick-off, punting, place kicking, drop kicking, direct pass plays, systems of offense in general, quarter-back pass plays, interference, signals, training, and equipment.

130. **BASKET BALL.** Elective, summer school. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

The work covers a discussion of the rules, technique of basket shooting, foul throwing, catching and passing, dribbling, reverse turn, different styles of play, offense, defense, team work, selection of players, training and equipment.

135. **BASE BALL.** Elective, summer school. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

The course includes discussion of the rules, fielding, batting, bunting, base running, sliding, team work, pitching, catching, proper way to play each position, indoor and outdoor practice methods, coaching, signals, training and equipment.

140. **TRACK AND FIELD SPORTS.** Elective, summer school. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

This course covers discussion of the rules, starting, sprinting, distance running, hurdling, jumping, vaulting, shot putting, discus throwing, javelin throwing, training, dieting, and equipment.

ATHLETICS

DEPARTMENTAL ATHLETICS. In the fall and in the spring the courses in the gymnasium are partly supplemented by instruction in outdoor athletics. Individuals are assigned to the kind of work best suited to them. Attendance is compulsory upon those participating. In the fall the following sports are offered: football; track and field events; cross-country running; and outdoor basket ball. In the spring are offered: baseball; track and field events; cross-country running; and outdoor basket ball.

Cross-country running is encouraged throughout the year. Natural exercise in the open air takes precedence of all other forms of exercise. Opportunity is offered for tennis, but it cannot be elected in place of required work.

Days unsuited for outdoor work are devoted to a discussion of playing rules, the principles of training for athletic contests, and lectures on team work.

INTRAMURAL ATHLETICS. All athletics within the institution, including the School of Agriculture teams, come directly under the supervision of the Department of Physical Education. It is the aim of the department to furnish an opportunity for all students to participate in some form of healthful athletic competition. To carry out the above aim, class football is maintained during the fall among the different classes of the College, also among the different classes of the School of Agriculture. Basket ball also is promoted during the fall and early part of the winter among the different fraternities, different classes, and different cadet companies, as well as among the students of the different departments of the College.

The work of the spring is largely given over to competition in baseball among the different classes, both in the College and School of Agriculture, the different departments of the institution and boarding-house teams. It is the aim of the department, too, to revive an interest in track athletics among the different classes of the institution. All these activities as promoted will be run, as nearly as possible, on a tournament plan, making it possible for a large majority of the students to participate in some form of activity. Suitable trophies will be presented and suitable emblems will be granted to participants on winning teams.

In addition to interclass competition there will be a small outside schedule for the School of Agriculture in the different forms of athletics promoted by the department.

By action of the Student Council, approved by the Faculty, the following rules govern class athletics contests:

1. Managers of class teams are required to play only men who hold assignments to the class with which they play.
2. The requirements for participation in class games are the same as for varsity teams.
3. The respective managers of class athletics are required to present a certified list of eligible players to each other at each game.
4. No man who has been a member of the varsity squad during a given season shall participate in a class game during that season.
5. No man shall participate in a class game who has won a K in that sport.

INTERCOLLEGIATE ATHLETICS. These contests are promoted and encouraged for the more vigorous students, because of their effect upon College life and their wide social and moral value to the participants. Intercollegiate teams should represent the final stage of selection in an educational process and development among a large number of students, thereby giving both a rational physical-education system and a healthful system of sport. Intercollegiate contests are scheduled for football, basket ball, track athletics, and tennis. The College is a member of the Missouri Valley Conference and competes with the best teams in the Middle West.

Intercollegiate athletics are placed under the supervision of the Athletic Board by an order of the Board of Administration. This Athletic Board consists of the President of the College, four other members of the Faculty appointed by the Board of Administration, and one member from each College class, elected by his class.

Participation in intercollegiate athletic contests is fixed by the following Missouri Valley Conference rules:

1. No student is eligible who receives pay from his institution as a regular instructor.
2. No student is eligible who receives pay for his services as player or manager of his team.
3. No student who has received pay for his athletic skill or knowledge is eligible to participate in any intercollegiate contest (except for summer baseball prior to 1912).

4. No student shall participate in contests as a member of an athletic team except on his home baseball team. No student shall play under an assumed name.

5. No student shall participate in intercollegiate sport for more than three years.

6. No graduate student shall participate in any intercollegiate contest.

7. No student shall participate in intercollegiate contests who has not been in attendance one full year prior to the date of contests, who has not passed in his entrance requirements, who has not passed in at least 30 semester hours' work during the year previous to the contest, and who is not maintaining passing grades in 12 credit hours during the current semester.

8. No person who, having participated in any intercollegiate contest, fails to remain in College the remainder of that semester, unless excused by his Dean for sickness, or other sufficient reason, shall participate again until he shall have completed six months of work following his last participation.

PHYSICAL EDUCATION FOR WOMEN

All young women in the College are required to take two years of physical education unless excused by the Dean of Women.

After the two years' required physical education have been completed, women have the privilege of electing physical education for a total of four credit hours; such elective work must be approved by their Dean. Athletic Association points are awarded for elective work.

PHYSICAL EXAMINATIONS

A physical examination of each young woman is made by the instructor in charge of women before permission to enter a class is given. This includes a system of body measurements, strength tests, and examination of the condition of the heart and lungs. Physical defects, abnormalities and weaknesses are noted, and special exercises are provided for the student needing the individual corrective work.

A suit has been adopted which consists of an all-white middy blouse, black tie, and black plaited bloomers. White tennis shoes with white rubber soles are used. For swimming, girls must have the regulation one-piece tank suit made from brown cotton covert, according to a pattern approved by the Department of Physical Education, or a one-piece gray knit suit. Girls should not buy their swimming suits before arriving in Manhattan. For further information address Women's Department of Physical Education, K. S. A. C., Manhattan, Kan.

COURSES IN PHYSICAL EDUCATION

151A. PHYSICAL EDUCATION W-I. Freshman year, first semester. Lectures and gymnasium, three hours. One semester credit. Dean Van Zile, Miss Bond and Miss Bartholf.

Instruction in hygiene and social problems is an essential part of this course. In these lectures, in addition to the problems of hygiene as applied to individual health, the biological truths that lead to serious, respectful consideration of social and sex hygiene are presented. This part of the course is given by the Dean of Women.

The physical training part of this course is divided into two hours a week of regular gymnasium work and one hour of interpretative dancing, folk dancing, games, tennis, hockey, basket ball, or swimming. Classes are in part held out of doors when the weather permits.

152A. PHYSICAL EDUCATION W-II. Freshman year, second semester. Gymnasium, three hours. One semester credit. Prerequisite: Physical Education W-I. Miss Bond and Miss Bartholf.

In this course the marching tactics, floor work, etc., are continued for two hours a week, and basket ball, games, interpretative dancing, folk dancing, tennis, and swimming are carried on for one hour a week.

153, 154. PHYSICAL EDUCATION W-III AND W-IV. Sophomore year, first and second semesters, respectively. Gymnasium, three hours. One semester credit. Miss Bond and Miss Bartholf.

The work in these two courses is a continuation of that of courses 151A and 152A. More advanced work in marching tactics and apparatus is here given.

175. GYMNASTICS. Elective, summer school. Lectures and recitations, one and one-half hours; practical work, three hours. One semester credit. Miss Bond.

This course is especially planned for the needs of the teacher in the public schools where no special teacher in this subject is employed. Lectures are given on the general theory of gymnastics and the physiological reason for each exercise. A notebook is required.

Practical Work.—The practical work includes free exercises, hand apparatus, heavy apparatus, and practice teaching.

178. FOLK DANCING. Elective, summer school. Lectures and recitations, one hour; practical work, four hours. One semester credit. Miss Bond.

Lectures are given on the physiological benefit derived from the dances, in costuming, and in the use of the dances in festivals and fetes. A notebook is required.

Practical Work.—This course offers graded folk dances of the different nations, suitable for use in schoolrooms, playgrounds, or gymnasiums.

181. GAMES. Elective, summer school. Lectures and recitations, one hour; practical work, four hours. One semester credit. Miss Bond.

Lectures are given on the problems of grading games, and on the physiological benefits received. A notebook is required.

Practical Work.—This course offers practice in games for grammar schools, high schools, playgrounds and gymnasiums.

182. PLAYGROUND MANAGEMENT. Elective, summer school. Lectures and recitations, one hour; practical work, to be arranged. One semester credit. Miss Bond.

This course includes discussions of the organization and administration of playground activities and equipment, and practical experience in conducting such activities.

184. ESTHETIC DANCING. Elective, summer school. Practical work, three hours. One-half semester credit. Miss Bond.

This is a class for beginners. Technique and simple esthetic dances are taught. No exercise gives better training in muscle control, poise, and good carriage than does esthetic dancing.

187. TECHNIQUE OF BASKET BALL, BASE BALL, AND HOCKEY. Elective, summer school. Lectures and recitations, three hours. One semester credit. Miss Bond.

This course is devoted to the technique of these sports, the physiological benefit derived, and the organization of each into interclass contests.

190. SWIMMING W. Open to all women students of the College. Both semesters. No credit. Miss Bartholf.

This is a course in swimming in which individual instruction is given in several styles of swimming and diving.

Physics

Professor HAMILTON
Associate Professor FLOYD*
Associate Professor RABURN
Assistant Professor STEWART

Assistant Professor CONVERSE
Assistant Professor BRACKETT
Instructor MILLER
Instructor TAYLOR

Recognizing the need of a thorough knowledge of the fundamental laws and principles involved in all physical changes, provision has been made, in the courses which follow, for both a theoretical and a practical treatment of the subject. Instruction is based upon the facts given in selected textbooks, and these topics are enlarged upon by lectures and illustrated by experimental demonstrations. The purpose is to give a training in exact reasoning, and a knowledge of principles that will be factors in the solution of problems in all branches of science as well as in everyday life.

The laboratory work which accompanies the courses in physics gives a student abundant opportunity to test the principal laws of the science; and, since he is expected to arrange and operate the apparatus, the work should enable him to acquire skill in manipulation, precision of judgment, and care in the use of delicate instruments. The laboratories are well arranged for the work, and the equipment provided is of a nature adapted to meet the requirement of accurate work in all courses. The manual in use in most of the courses is one prepared by the department to meet the exact conditions and equipment of the laboratory.

COURSES IN PHYSICS

FOR UNDERGRADUATES

101. HOUSEHOLD PHYSICS. Freshman year, both semesters. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: One year of high-school physics or its equivalent. Professor Hamilton and Associate Professor Floyd.

This course consists of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light, with its color phenomena and actinic effects; of some of the optical instruments used in scientific work; a study of electric lighting, and illumination, and of cost of operating many of the appliances used in the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliances and of the operator.

111. AGRICULTURAL PHYSICS. Sophomore year, first semester. Class work, three hours. Three semester credits. Associate Professor Raburn and Assistant Professor Stewart.

This course includes a series of lectures and class demonstrations based upon heat, light and electricity as involved in influencing farm life. The elementary factors of weather and weather forecasting are explained, and access is given to the weather records and apparatus of the College weather station. The work in light emphasizes the value of light in plant growth, in spectrum analysis, and in many of the natural phenomena. Electricity is presented in such a manner that the student may

* Absent on leave, year 1919-'20.

gain a working knowledge of the various electrical appliances that can be used on the farm. Text: Spinney's *A Textbook of Physics*.

120. PHOTOGRAPHY. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Training in physics and chemistry. Professor Hamilton.

The importance of a record of exact details, as shown in a photograph, makes this work valuable to all scientists. The course gives the student some knowledge of the chemical and physical principles involved in the art, as well as practice in making good negatives and prints. The lecture and laboratory work deals with: Things to be considered in selecting a camera; proper exposures; composition of pictures; proper development of plates; tests of different developers; retouching; reducing and intensifying negatives; printing and mounting; making lantern slides, bromide enlargement, and the prints best adapted for illustrated articles in newspapers and magazines.

130. WIRELESS TELEGRAPHY. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Elementary Physics. Professor Hamilton and Assistant Professor Stewart.

The work includes a study of the most efficient types of receiving and transmission sets, a study of the fundamental principles of electric waves, and of the most important points to be observed in the erection of a good plant.

Laboratory.—The student learns in the laboratory to receive and to transmit messages, and as he learns the code he is instructed in field work.

135. GENERAL PHYSICS I. Sophomore year, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisites: Elementary Physics and Plane Trigonometry. Associate Professors Raburn and Floyd and Assistant Professor Stewart.

This course, like the one following, is provided for those intending to specialize in scientific lines. It covers, in as thorough a manner as possible, the general principles involved in mechanics, sound, and heat. Text: Reed and Guthe's *College Physics*.

Laboratory—The work is based upon laws and principles discussed in the classroom, and is so arranged that the students may have a practical illustration of the facts learned.

140. GENERAL PHYSICS II. Sophomore year, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: General Physics I. Associate Professors Raburn and Floyd and Assistant Professor Stewart.

This course includes a study of the theory of electricity and light. The class follows the subject as outlined in the text, but special emphasis is placed upon those parts that have an immediate bearing on the work of other sciences, such as electrolysis, thermal effects, relation of electrical and mechanical energy. Text: Reed and Guthe's *College Physics*.

Laboratory.—The work follows the subjects presented in the class and is conducted with a grade of apparatus that gives training in the use of the better class of instruments employed in scientific investigations.

145. ENGINEERING PHYSICS I. Sophomore year, both semesters. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Elementary Physics and Trigonometry. Professor Hamilton, Associate Professor Raburn, and Assistant Professor Brackett.

This course in mechanics, sound and heat is intended to give the engineering students as thorough a working knowledge as possible of the fundamental units and laws involved in force, work, power, and energy; also the laws of simple machines, gases, and liquids as they occur in the transformation of force and energy. Text: Kimball's *College Physics*.

Laboratory.—The work consists of the use of apparatus to test the laws of inertia, moments of force, moments of torsion, elasticity, and rigidity, and other laws and principles involved in mechanics and heat. Accurate measurements and carefully recorded data are required.

150. ENGINEERING PHYSICS II. Sophomore year, both semesters. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisite: Engineering Physics I. Professor Hamilton, Associate Professor Raburn, and Assistant Professor Brackett.

This course treats of electricity and light. The work in electricity is of such a nature as to give the student working knowledge of the units employed, and of the fundamental laws; and to acquaint him with methods of producing a current, its uses, and the system by which electrical energy is measured. The principal phenomena of light, together with the laws that may have direct bearing upon light as a standard and method of measurement, are treated in this course. Text: Kimball's *College Physics*.

Laboratory.—The electrical work in this course includes measurements of resistances, a study of primary cells, and the transformation of mechanical into electrical energy. The work of light consists of a study of the laws of reflection and refraction, and measurements of wave lengths by means of the spectroscope, the use of the interferometer, and photometry.

FOR GRADUATES AND UNDERGRADUATES

213. ACOUSTICS. Elective, first semester. Class work, one hour. One semester credit. Prerequisite: Engineering Physics II. Associate Professor Floyd or Assistant Professor Brackett.

In this course a special study is made of the acoustic properties of buildings, of the architectural defects which give rise to poor acoustics, with a study of special methods used to avoid such troubles in construction of buildings or to correct them in constructed buildings.

221. MOLECULAR PHYSICS. Elective, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisites: College Physics and College Chemistry. Associate Professor Floyd and Assistant Professor Stewart.

This course includes a study of molecular kinetics of gases, liquids and solids; liquid-gas systems; crystal-gas systems; crystal-liquid systems; Brownian movement; solutions, osmosis, and electrolytic conduction.

Laboratory.—The laboratory work is based on the theory as given in the class work, and includes the determination of capillary constants, molecular conductivities, percentage ionization, and specific heats of gases.

222. HARMONICS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisites: One year each of music and elementary physics. Professor Hamilton and Associate Professor Floyd.

This course is given to students of music so that they may learn the fundamental principles of sound that are associated with harmony. It is a lecture and demonstration course that deals with many facts of interest relating to the construction of scales and chords. A clearer understanding of composition and of tone quality may be had if the physical laws of sound are understood.

223. PHYSICAL MEASUREMENTS. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Professor Hamilton and Associate Professor Floyd.

The class work is based upon principles that are involved in instruments for accurate measurements. The instruments described and used are typical ones employed in measurements of mechanical forces, heat, and electricity. Part of the class work is the development of formulas.

Laboratory.—The work is so selected as to give the widest possible range in the variety of instruments used and of principles illustrated.

224. **SPECIAL METHODS IN THE TEACHING OF PHYSICS.** Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. For credit towards the State teachers' certificate this must be taken in the student's senior year. Prerequisites: Educational Psychology and College Physics. Associate Professor Floyd and Assistant Professor Converse.

This course is intended for those who are either teaching or expecting to teach physics in secondary schools. The class work includes an analysis of the present status of physics and of physics instruction in our high schools, and is based upon a critical study of the State text as well as other modern texts that may be used as reference. Special effort is made to vitalize the work and to make it apply to everyday life. Lectures, library work, demonstrations and practice teaching are used as methods of directing the course.

Laboratory.—The laboratory work includes the formation and adaptation of courses suitable for either rural or city high schools.

230. **SPECTROSCOPY.** Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: College Physics and College Chemistry. Associate Professor Raburn or Floyd.

This is an advanced course in light, intended to cover the theory and use of the spectroscope and spectrometer as instruments for identifying elements or their compounds, when rendered incandescent, by means of their characteristic spectra or definite wave lengths.

Laboratory.—The laboratory work consists of calibration of prisms and gratings for ready use in chemical laboratories and also gives ample training in measuring wave lengths and in identifying the spectra of many substances.

233. **RADIO-ACTIVITY AND ELECTRON THEORY.** Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: College Physics and College Chemistry. Associate Professor Raburn.

The nature of the electron and its behavior in electric and magnetic fields, are studied. Temperature effects and behavior of the electron in cathode tubes using a hot cathode are discussed and studied in detail. The methods of determining the mass and velocity of electrons is developed from the historical standpoint. A study is made of the nature and effects of the various rays, including x-rays and ultra-violet rays and the emanations from the known radioactive substances.

Public Speaking

Professor EMERSON
Instructor BOWMAN

It is the constant effort of the Department of Public Speaking to relate the training in public speaking with the work of all the other departments of the College; to harmonize it with the spirit of the College, which is distinctly technical and industrial. With this object in view, students are trained in the presentation and discussion of the valuable ideas acquired in their various fields of study. The method pursued in this training is that of actual practice on the platform before an audience. Conviction, not entertainment, is the dominant purpose in every case.

The department seeks to place itself at the service of those various organizations of the College which desire or need its assistance. In addi-

tion to its regular courses it aims to make itself available as far as possible for individual rehearsals; for the training of the orators of the College; and for the directing and coaching of plays. Students are urged to ally themselves with the organizations representing these various activities.

COURSES IN PUBLIC SPEAKING

FOR UNDERGRADUATES

101. PUBLIC SPEAKING I. Elective, both semesters. Class work, two hours. Two semester credits. Mrs. Bowman.

The purpose of this course is to enable the student to attain some proficiency in the art of oral interpretation. The training given seeks to develop a natural style. In connection with the practice work upon the platform the student is given such points of theory and such routine drill as are necessary for the development and use of the voice and for proper platform deportment.

102. PUBLIC SPEAKING II. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Public Speaking I, or by arrangement with the head of the department. Mrs. Bowman.

This course is a continuation of Public Speaking I, and involves a more advanced study of the art of oral interpretation.

106. EXTEMPORE SPEECH I. Freshman and junior years and elective, both semesters. Class work, two hours. Two semester credits. Professor Emerson.

The work of this course consists in the preparation and delivery of short addresses based on prepared outlines. Careful preparation of material is required. The plan of the speech is made in advance, but the choice of language is left for the moment of speaking. Criticism and points of theory given by the instructor supplement the course.

108. EXTEMPORE SPEECH II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Extempore Speech I, or its equivalent. Professor Emerson.

This course is a continuation of Extempore Speech I. The same methods are pursued but special attention is given to the telling of humorous stories, to after-dinner speaking, and the like.

110. ADVANCED PUBLIC SPEAKING. Elective, second semester. One semester credit. Prerequisites: Extempore Speech I and II, or by special arrangement with the head of the department. Professor Emerson.

In this course the work consists of the preparation and delivery by the student of one extended lecture-recital, lecture, or address during the semester. This is supplemented by class lectures and practice, and by a study of types. It may include the preparation and delivery of institute talks, or addresses suitable for extension work.

Zoology

Professor NABOURS†
 Professor ACKERT*
 Associate Professor HARMAN
 Assistant Professor HISAW
 Instructor BROWN

Instructor MARTIN
 Assistant WILLMANN
 Assistant HURD
 Assistant RUDE

The courses have been planned to give a fundamental knowledge of the structures, functions and relations of animals; information concerning the manner in which animals respond to the conditions of the environment; an appreciation of their human values; and a consideration of the problem of heredity and evolution.

The courses in General Zoölogy (101 and 102, and 105) constitute a general survey, and form an excellent introduction to all lines in agriculture, general science, and home economics. Embryology (117), Cytology (214), Advanced Mammalian Embryology (220), Parasitology (123), Evolution and Heredity (217), and Paleontology (Geology 201) are preliminary to advanced work in animal breeding, animal husbandry, dairy husbandry and veterinary medicine. Selections may be made among these courses and Advanced Zoölogy (201, 202), Invertebrate and Vertebrate Taxonomy (205, 208), Economic Zoölogy (126), Ecology (211), Embryology and Physiology (108), Zoölogical Problems (129), Research in Zoölogy (301), and the Seminar (236), by those who expect to do advanced work in zoölogy or entomology, or become teachers of biology.

The classrooms and laboratories are equipped with charts, models, microscopic binoculars, microtomes, paraffin baths and other apparatus both for elementary and advanced work, and a good natural-history museum is available.

COURSES IN ZOÖLOGY

FOR UNDERGRADUATES

101 and 102. GENERAL ZOÖLOGY I AND II. Sophomore year and elective, first and second semesters, respectively. Class work, two hours; laboratory, three hours. Three semester credits for each course. Professor Nabours, Professor Ackert, Associate Professor Harman, Assistant Professor Hisaw, Miss Brown, Mr. Martin, Miss Willmann, and Miss Hurd.

In General Zoölogy I an elementary study is made of the structures and functions of types selected to illustrate the invertebrates; in course 102 an elementary study is made of the structures and functions of types selected to illustrate the development of the phylum chordata.

Laboratory.—The form and activities of animals are observed both in the field and in the vivaria, and important systems of those animals selected as types are dissected and sketched.

105. GENERAL ZOÖLOGY. Sophomore year, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Men and women in separate classes. Professor Nabours, Professor Ackert, Associate Professor Harman, Assistant Professor Hisaw, Miss Brown, Mr. Martin, Miss Willmann, and Miss Hurd.

The structures and functions of types of both invertebrates and vertebrates are studied.

* In charge, 1919-'20.

† Absent on leave, 1919-'20.

Laboratory.—Studies of the form and function of types of living animals, and dissection and reconstruction of the important systems of selected types.

108. EMBRYOLOGY AND PHYSIOLOGY. Sophomore year and elective, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisites: Zoöl. 105 or equivalent, and Chem. 121. Professor Nabours, Professor Ackert, Associate Professor Harman, Miss Brown, and Miss Willmann.

The first three-fifths of the semester is devoted to (a) embryology and the remaining two-fifths to (b) human physiology. The course thus falls into two closely related parts: (a) a study of the development of the germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth with special reference to the human species; and (b) a study of the functions of the organs and systems of the human body, with special consideration of the digestive, respiratory, circulatory, nervous, and urinogenital systems and organs of special sense.

Laboratory.—The laboratory work includes: (a) studies of the male and female germ cells, stages in the process of fertilization, the segmenting ovum, and whole mounts and serial sections of the chick and pig embryos in several stages of development, with demonstrations of types of mammalian foetal relations; and (b) experiments for the demonstration of the composition and functions of bone, blood, lymph, and the reaction of muscles, nerves, parts of the digestive, respiratory, excretory and other systems.

111. GENERAL ZOÖLOGY VET. Freshman year, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Given concurrently with Anat. 101. Professor Ackert, Assistant Professor Hisaw, and Mr. Martin.

A general study is made of the forms in the animal kingdom, with attention given to classification, distribution, habitats, and relation to each other and to man.

Laboratory.—The form and activities of animals are observed in the field, vivaria and the museum, and a comparative study of the systems of organs in a few selected types is made.

114. EMBRYOLOGY VET. Freshman year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Given concurrently with Anat. 106. Prerequisites: Zoöl. 111 and Anat. 101. Professor Ackert, Assistant Professor Hisaw, and Mr. Martin.

The origin of the germ cells, fertilization, the establishment of relations between the uterus and embryo, the development of membranes, and the nutrition of the foetus in mammals are considered briefly.

Laboratory.—Exercises in the reconstruction of organs and systems from sections and dissections in the chick and pig embryos, and of foetal relations in mammals.

117. EMBRYOLOGY. Junior and elective, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Zoöl. 101 and 102, or 105. Professor Nabours, Professor Ackert, and Assistant Professor Hisaw.

The development of the germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth in mammals are studied in this course.

Laboratory.—Studies of the male and female germ cells, stages in the processes of fertilization, the segmenting ovum, and whole mounts, serial sections, and reconstruction of the chick and pig embryos in several stages of growth, with demonstrations of types of mammalian foetal relations form the subject matter of the laboratory investigation.

123. **PARASITOLOGY.** Senior year and elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Courses 101 and 102, or 105. Professor Ackert.

A study is made of the biology, life histories, and economic importance of the external and internal parasites of the domestic animals and man.

Laboratory.—The structural and functional adaptations of selected types of parasites are studied in the laboratory.

126. **ECONOMIC ZOÖLOGY.** Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ackert.

The bird and mammal groups are studied comprehensively. Specimens in the museum are used extensively.

Laboratory—The laboratory work comprises largely three-hour field trips to a number of selected areas: woods, streams, meadows, College campus, and farm. This work includes identification of birds and mammals, with special studies of their migration, adaptation, and economic importance.

129. **ZOÖLOGICAL PROBLEMS.** Elective, both semesters. One or two semester credits. Prerequisites: Consult instructors. Professor Nabours, Professor Ackert, Associate Professor Harman, and Assistant Professor Hisaw.

Individual problems in heredity, parasitology, cytology, embryology, and animal behavior are assigned by the instructors in charge.

FOR GRADUATES AND UNDERGRADUATES

201. **ADVANCED INVERTEBRATE ZOÖLOGY.** Elective, first semester. Class work, two hours; laboratory, six hours. Four semester credits. Prerequisite: Zoöl. 101 and 102, or 105. Professor Ackert.

A comprehensive study is made of representatives of the invertebrates, from the standpoints of behavior, comparative anatomy, development, and phylogeny. Representatives of the invertebrate groups are studied from the morphological aspect.

202. **ADVANCED VERTEBRATE ZOÖLOGY.** Elective, second semester. Class work, two hours; laboratory, six hours. Four semester credits. Prerequisite: Zoöl. 101 and 102, or 105. Professor Ackert.

The behavior, comparative anatomy, development, and phylogeny are studied, giving a comprehensive view of the chordates. A study is made of the anatomy and morphology of certain representative vertebrates.

205. **TAXONOMY OF INVERTEBRATES.** Elective, first or second semester. Laboratory, nine hours. Three semester credits. Prerequisites: Courses 101 and 102, or 105; and Ent. 216, concurrently. Assistant Professor Hisaw.

Practice is had in the use of the keys for the identification of species, and emphasis is placed on familiarity with the literature of invertebrate taxonomy, except insects, and on the identification of species in the local fauna.

208. **TAXONOMY OF VERTEBRATES.** Elective, first or second semester. Laboratory, nine hours. Three semester credits. Prerequisites: Zoöl. 101 and 102, or 105; and Ent. 216, concurrently. Assistant Professor Hisaw.

This course is similar to course 205, with the difference that vertebrates instead of invertebrates are studied.

211. **ANIMAL ECOLOGY.** Elective, second semester. Lectures, one hour; laboratory and field work, six hours. Three semester credits. Prerequisites: Zoöl. 101 and 102, or 105, and Ent. 101. Assistant Professor Hisaw.

This course deals with the relation of animals to the complete environment. The associational method of study is used and the subject is con-

sidered from the descriptive, comparative and explanatory standpoints. Special attention is given to the dynamic factors of the environment and their effect on the present status and future changes of the animal community. The field work gives practice in the methods of field ecology and deals with the application of general principles to local conditions. The fundamental principles and other general aspects of the science are presented in the form of lectures.

214. **CYTOLOGY** Elective, first semester. Lecture, two hours; laboratory, six hours. Four semester credits. Prerequisite: Zoöl. 108, 117, or equivalent. Associate Professor Harman.

Methods of preparing material for microscopical study; killing, fixing, staining, and sectioning; the development of the germ cells; and theories of structure and functions of the different parts of the cell are matters considered in this course. The work forms a basis for studies of heredity and related subjects.

217. **EVOLUTION AND HEREDITY** Elective, second semester. Lecture, two hours; library reference reading and reports, three or six hours. Three or four semester credits. Prerequisites: Consult instructor. Professor Nabours.

A lecture and reading course dealing with the development of the idea of evolution; the evidence and the principal theories of the causes; problems of variation, heredity, and experimental evolution.

220. **ADVANCED MAMMALIAN EMBRYOLOGY.** Elective, second semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisites: Zoöl. 108, 114 or 117, or the equivalent. Professor Nabours and Associate Professor Harman.

The course consists of further study of the main facts of embryology, with special reference to their bearing upon biological theories, the consideration of embryological problems, and a comparative study of the physiology of reproduction in mammals, including man.

225. **ZOÖLOGY AND ENTOMOLOGY SEMINAR** Elective, both semesters. One two-hour session a week. One credit. Subject matter changes each semester. Prerequisite: Consult seminar committee.

This course consists in the presentation of original investigations, reviews of papers appearing in current journals, summaries of recent advances in the various fields, and discussions of the various aspects of the fundamental problems of modern biology.

FOR GRADUATES

301. **RESEARCH IN ZOÖLOGY.** Elective, both semesters and during the summer. One to five semester credits. Prerequisites: Consult instructors. Professor Nabours, Professor Ackert, Associate Professor Harman, and Assistant Professor Hisaw.

Individual research problems in heredity and experimental evolution, parasitology, cytology, embryology, and animal behavior are assigned.

Special Courses for Teachers

At the present time teaching of vocational subjects in the public schools is undergoing great development. Many schools are introducing manual training, agriculture, domestic science and domestic art, and many others are extending the work hitherto given. The State law requiring the teaching of agriculture in the rural schools is also creating a strong movement in the same direction. There is an active demand for teachers who can handle such work successfully.

The College offers to graduates of other institutions, and indeed to all who have studied such subjects as may be prerequisite, unexcelled facilities for securing training in the industrial subjects indicated. Courses extending over one or two years may be arranged by means of which the student who is already prepared in English, mathematics, and to a certain extent in the sciences, may prepare himself to enter a broader and, frequently, a more remunerative field.

Nos. 31, 32, 33, 35, 36 and 37, on pages 210 and 211, exhibit groupings that illustrate the possibilities in work of this character, and other arrangements may be made. Those taking such courses will be cared for in the regular classes provided for other students, and no limitation is imposed except that the prerequisites for any subject must have been taken previously, here or elsewhere. These prerequisites are stated in this catalogue in connection with the description of each subject. The catalogue also shows the semester in which a subject is regularly given.

The conditions and requirements for the different classes of state certificates are stated in the introductory paragraphs for the Department of Education, page 240.

The course for persons who wish to prepare for teaching vocational agriculture under the Smith-Hughes law is outlined under the Division of Agriculture, page 91, and the course for those wishing to qualify as teachers of vocational home economics, under the same law, is given on page 190, under the Division of Home Economics.

Kansas State Agricultural College

Summer School

May 28 to July 30, 1920

EDWIN LEE HOLTON, *Dean*.

PURPOSE

There is no larger or better equipped plant devoted to the teaching of agriculture, home economics, mechanic arts, and related subjects than Kansas has in her State Agricultural College. In order that this plant may not remain idle during the summer months, the Board of Administration authorized the organization of a Summer School. The College is authorized by an act of Congress to expend each year a portion of the national appropriation for "providing courses for the special preparation of instructors for teaching the elements of agriculture and mechanic arts."

Each year there is an increasing demand for trained teachers of agriculture, shop work, mathematics, the sciences, and home economics. The College has not been able to supply this demand. The Summer School offers an opportunity for experienced teachers to prepare themselves to meet the new demand placed upon the public schools, viz.: Preparing boys and girls for vocational and social efficiency.

ADVANTAGES AT KANSAS STATE AGRICULTURAL COLLEGE

There is a growing conviction among the leading educators that the best institution in which to train teachers of vocational subjects is a well-equipped technical college, where the courses of study are pointed towards the producing vocations. The Kansas State Agricultural College is such an institution.

The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens and experimental fields. Broad, macadamized, and well-shaded avenues lead to all parts of the campus. Including the campus of 160 acres, the College owns 1,137 acres of land. Outside the campus proper, all the land is devoted to practical and experimental work in agriculture. Within the College grounds most of the space not occupied by buildings or needed for drives and ornamental planting is devoted to orchards, forest and fruit nurseries, vineyards, and gardens.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of attractive white limestone obtained from the College quarries. The College owns and operates its own system of waterworks, and is provided with a complete sewerage system.

The library is open during the summer and its valuable collection of books, periodicals, bulletins, and reports is placed at the service of the Summer School students.

EXPENSES

Tuition is free. An incidental fee of \$5 is charged all students whose homes are in Kansas; for nonresidents of the State an incidental fee of \$10 is charged. No matriculation or entrance fee is charged for the Summer School of 1920. Each student pays also a sick-benefit fee of \$1. Receipts for these fees must be presented before enrollment in the Summer School classes. Table board varies from \$5 to \$7 a week. Three meals a day, except on Sunday, are served at the College cafeteria in Kedzie Hall. Room rent ranges from \$10 to \$15 per month. The College Young Men's Christian Association offers accommodation in its building for a limited number of men students at prices ranging from \$10 to \$12 a month. The cost of rooms is reduced by half where two students room together.

The College reserves the right to change its schedule of fees at any time without previous notice.

REGISTRATION AND LATE REGISTRATION

Registration will take place in Nichols Gymnasium from eight until five o'clock on the opening day, Friday, May 28. No one will be allowed to register for full-time work after Friday, June 11. All class and laboratory work begins with the first period, Saturday, May 29.

COLLEGE CREDITS AND VISITING PRIVILEGES

Full College credit will be given for all courses satisfactorily completed by regularly matriculated students unless otherwise specified in the announcement of courses. Students desiring College credit will not be allowed to carry more than nine semester credit hours of work, except upon written approval of the Dean of the Summer School and of the Dean particularly concerned. In exceptional cases and when approved as above, undergraduate students may carry not to exceed ten semester credit hours. Graduates of colleges may carry for graduate credit nine semester hours; in exceptional cases, and not for graduate credit, they may carry twelve semester hours, subject to the approval of the Dean of the Summer Session and of the Dean particularly concerned.

Those interested primarily in freshening their acquaintance with subject matter, in enlarging their outlook, or in improving their methods of teaching, and not caring for credit toward a degree, may, upon showing a receipt for Summer School fees, be given a visitor's card, which will admit them to any courses offered. They should, however, make out class cards for any courses which they wish seriously to pursue. A limited visiting privilege may be granted to candidates for College credit by the Dean in case such privilege be not likely to interfere with the quality of the College-credit work.

CONVOCATION AND COLLEGE LECTURES

From time to time, as announced, classes will be displaced for an hour for special lectures, musical or literary exercises. During the Summer Session lecturers of note, specialists in their particular fields, will lecture before the Summer School.

At other times the program will be musical or literary in nature. These numbers are furnished by the Summer School music staff, by visiting artists, and by members of the Summer School chorus and orchestra. Every student with musical ability is urged to join one of the musical organizations.

RECREATION AND AMUSEMENT

A part of the attraction of the Summer School session is the opportunity for recreation and social environment. The vicinity of Manhattan is rich in features of interest for "hikes." Usually lunch is carried and supper eaten on these trips. The agronomy or experimental farm is visited on one of these trips; the serum plant and live-stock barns are visited on another. Other hikes are made to places of natural interest. Camp Funston is only forty minutes distant by trolley, and a trip to the camp makes an enjoyable and instructive outing.

There are picture shows on the campus; parties, "community" sings, and folk games are held. There is a play time when all members of the Summer School may spend an hour in real play. Baseball, hockey, tennis, swimming, and other sports are carried on.

For those who appreciate opportunities for literary and forensic improvement, combined with social good times, the Summer School Literary Society meets Saturday evening of each week and is open to all students.

Courses in the Summer School

Division of Agriculture

F. D. FARRELL, Dean

AGRICULTURAL ECONOMICS

Associate Professor GRIMES
Specialist ERIC ENGLUND

101. AGRICULTURAL ECONOMICS. Elective. Class work, six hours. Three semester credits. Associate Professor Grimes and Mr. Englund.

The course in agricultural economics undertakes to familiarize the student with the economic principles and forces with which every farmer must deal. The relative profitability of farm enterprises, the proportion in which the factors of production should be combined for optimum results, and other phases of production are followed by the laws of values and the important questions connected with the exchange of farm products and the ultimate distribution of farm wealth.

106. FARM MANAGEMENT. Elective. Class work, four hours; laboratory, six hours. Three semester credits. Associate Professor Grimes and Mr. Englund.

Farming is studied as a business, taking up the factors which affect its success and methods of improving it to obtain the most efficient organization. Methods of leasing are also studied.

AGRONOMY

Professor THROCKMORTON
Assistant Professor ZAHNLEY

21. ELEMENTARY AGRICULTURE. Class work, four hours; laboratory, six hours. Three semester credits in School of Agriculture. Assistant Professor Davidson.

This is a general course planned for teachers of public schools who teach one year of agriculture. It covers the entire field of general agriculture, together with suggested outlines for a year's work in the laboratory. Texts, Waters' *Essentials of Agriculture*, and Call and Schafer's *Manual of Agriculture*.

101. GRAIN CROP PRODUCTION. Class work, four hours; laboratory, six hours. Three semester credits. Prerequisites: Botany 101. Assistant Professor Zahnley.

This course is a study of the distribution, relative importance, value, and production of grain crops, including wheat, corn, oats, barley, rye, rice, buckwheat, and flax.

120. TEACHERS' COURSE IN SOILS AND CROPS. Class work, four hours; laboratory, six hours. Three semester credits. Assistant Professor Zahnley.

This course is designed primarily for young women preparing to teach the one-year course in agriculture offered in many Kansas high schools. The course deals with the origin and formation, texture and composition of soils; the management of soils to maintain fertility; and the adaptation of soils to crops. It also deals with the distribution, relative impor-

tance, and production of such grain crops as wheat, corn, kafir, oats, barley, and rye; and such forage crops as sorghum, alfalfa, clover and grasses.

131. SOILS. Class work, six hours; laboratory, six hours. Four semester credits. Professor Throckmorton. Assistant Professor Zahnley.

This course comprises a study of the management of farm soils and deals with the origin of soils and their physical nature; the effect of different methods of cultivation upon the liberation of plant food; conservation of moisture, and physical conditions of the soils. Prerequisite: General Chemistry. Text, Lyon, Fippen, and Buchman's *Principles of Soil Management*.

ANIMAL HUSBANDRY

Professor McCAMPBELL
Associate Professor FERRIN
Associate Professor PATERSON
Assistant Professor IBSEN

104. PRINCIPLES OF FEEDING. Class work, six hours. Three semester credits. Prerequisite: Elementary Organic Chemistry. Associate Professor Ferrin.

This course involves a study of the digestive system and the processes of nutrition, and of the theory of the practical economy of rations, both for the maintenance and for the fattening of all classes of farm animals.

106. GENETICS. Class work, six hours. Three semester credits. Prerequisites: Zoöl. 105, and Bot. 105. Assistant Professor Ibsen.

This course embraces the general principles of heredity, variation, sex-limited inheritance, prepotency, fertility, and sterility.

170. TEACHERS' COURSE IN ANIMAL HUSBANDRY. Class work, six hours; laboratory, six hours. Four semester credits. Professor McCampbell and Associate Professor Paterson.

This course is planned especially to meet the needs of teachers who desire a general rather than a special course in animal husbandry. The work in the classroom embraces the following:

a. Feeding principles and practices, three weeks. Text: Henry and Morrison's *Feeds and Feeding*.

b. History of breeds and pedigrees, two weeks. Text: Plumb's *Types and Breeds of Live Stock*.

c. Breeding principles and practices, two weeks. Text: Munford's *Breeding Farm Animals*.

d. Housing, barns, sanitation, herd and flock management, fitting for shows, sale management, etc., two weeks. Lectures.

Laboratory.—The first seven weeks are devoted to judging; the last two weeks are given over to meat demonstrations.

DAIRY HUSBANDRY

Assistant Professor OLSON
Instructor ATKESON

101. ELEMENTS OF DAIRYING. Class work, four hours; laboratory, six hours. Three semester credits. Assistant Professor Olson.

This is a general course in dairying, dealing with the secretion, composition and properties of milk; care of milk and cream on the farm, a study of the different methods of creaming, construction and operation of farm separators; principles and application of the Babcock test; use of the lactometer; and buttermaking on the farm. Lectures are supplemented by textbook work.

Laboratory.—Practice in operating the Babcock test and lactometer; separation of milk; and farm buttermaking.

104. DAIRY JUDGING. Laboratory, six hours. One semester credit. Instructor Atkeson.

Dairy stock is judged from the standpoint of economical production and breed type. Score cards are used to teach the student to become accurate, thorough and systematic in the selection of animals as representatives of breeds or for breeding purposes.

HORTICULTURE

Professor AHEARN
Instructor PICKETT
Instructor DOERNER

101. PLANT PROPAGATION. Class work, four hours; laboratory, six hours. Three semester credits. Mr. Pickett.

A discussion of the natural and cultural methods of propagation; seeds, seed testing, and seed growing; treatment given to different classes of seeds; the production of seedlings for stock; grafting, budding, layering, making cuttings, and the special requirements necessary in propagating commercial fruits and ornamental plants. Lectures and assigned readings. Prerequisite: Plant Anatomy.

Laboratory.—Practical work in preparation of seeds, seed testing, the preparation of seed beds, the use of seeding machinery, transplanting, grafting, budding, and general nursery practice.

107. ORCHARDING. Class work, four hours. Two semester credits. Professor Ahearn.

This is a discussion of the conditions necessary for success with orchards. Location, improvement of soil, application of fertilizers, pruning, prevention of loss from frost, marketing and storage. Prerequisites: Plant Propagation, and Pomology II.

210. MARKET GARDENING. Class work, four hours; laboratory, six hours. Three semester credits. Professor Ahearn.

In this course a systematic study is made of both commercial and amateur gardening; soil improvement, the value of fertilizer, marketing and storage conditions are given special attention.

Laboratory.—The laboratory work consists of the preparation of the plans for gardens; seed testing; the construction of the hotbed; the use of tools and machinery; and practical work in the garden.

125a. LANDSCAPE GARDENING RECITATION. Class work, four hours. Two semester credits. Mr. Doerner.

Lectures are given on the principles of landscape art and the means of their application to the problems of improving lawns, yards, country homes, school grounds, and public parks. Opportunity is given the student to become acquainted with plant materials that are best adapted to Kansas conditions.

POULTRY HUSBANDRY

Assistant Professor FOX

101. FARM POULTRY PRODUCTION. Class work, two hours; laboratory, six hours. Two semester credits. Assistant Professor Fox.

This course takes up the problems of poultry management on the general farm. The subjects of feeding, breeding, incubating, brooding, and preparing for market are studied.

120. TEACHERS' COURSE IN POULTRY HUSBANDRY. Class work, two hours. One semester credit. Assistant Professor Fox.

This course takes up the problems of poultry management for egg and meat production. The subjects of feeding, breeding, housing, incubation, brooding, and preparing poultry for market are studied.

Division of Veterinary Medicine

R. R. DYKSTRA, Dean

ANATOMY AND PHYSIOLOGY

Professor BURT

213. PHYSIOLOGY. Class work, six hours. Three semester credits. Professor Burt.

The work in this subject consists of the study of the skeletal tissues, the circulatory, digestive, respiratory and other systems, in much the same manner as is done during the regular college course. The lectures are supplemented with demonstrations and experiments. Dissected specimens are used as often as possible instead of papier-mâché models. The laboratory is well equipped with physiological apparatus. This apparatus is freely employed and its application explained. The demonstrations and experiments are especially helpful to those engaged in teaching and those intending to teach this subject. Credit in this course is the same as the credit in Human Physiology. It may be substituted for Animal Physiology. Text, Martin's *Human Body*. References are also made to Howell's *Text Book on Human Physiology* and others. Teachers are recommended to use the text by Howell.

SURGERY AND MEDICINE

Instructor FRICK

167. FARM ANIMALS IN HEALTH AND DISEASE. Class work, six hours. Three semester credits. Doctor Frick.

In this course the common diseases of domesticated animals are discussed, and particular attention is devoted to first-aid treatment, preventive measures against the spread of contagious and infectious diseases, methods of taking temperatures, counting the pulse and respirations, modes of administering drugs, bandaging, etc. Various aids to correct diagnoses, particularly tuberculin testing of dairy and beef animals, are taken up. A few lectures on the more commonly used medicines are included. When clinical cases are available, they are used to visualize the instruction given in the classroom. This is a course for teachers and students preparing to teach vocational agriculture.

Division of Engineering

A. A. POTTER, Dean

APPLIED MECHANICS AND MECHANICAL DRAWING

Professor SEATON

Assistant Professor PEARCE

98, 99. MECHANICAL DRAWING FOR HIGH SCHOOLS. Lectures and recitations, two hours; drafting, eight hours. Three semester credits in the School of Agriculture. Assistant Professor Pearce.

A course intended for high-school teachers of mechanical drawing and for those desiring to make College entrance credits. The work of the course will be varied to suit the previous training of those who register for it. A study is made of drawing instruments and materials, drawing-room practice and conventions, lettering, orthographic projection, and

simple working drawings. Practice is also given in tracing and blue-printing. Text, French and Svensen's *Mechanical Drawing*.

101. APPLIED MECHANICS I RECITATION. Class work, six hours. Three semester credits. Prerequisites: Calculus I, and Engineering Physics II. Professor Seaton.

This course includes composition, resolution and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motion; work energy and power; graphical solutions of problems in statics. Text, Poorman's *Applied Mechanics*.

105. APPLIED MECHANICS I LABORATORY. Laboratory work, six hours. One semester credit. Must accompany or follow Applied Mechanics I Recitation. Professor Seaton.

Exercises are given in the calibration and use of laboratory measuring instruments and apparatus, such as micrometers, planimeters, dynamometers, platform scales, jacks, hoists and various types of testing machines. Standard tests are also made on cement. Text: Carpenter and Diedrichs' *Experimental Engineering* (This text is also used in the subsequent laboratory courses in applied mechanics and hydraulics, and in steam and gas engineering.)

110. APPLIED MECHANICS II RECITATION. Class work, ten hours. Five semester credits. Prerequisite: Applied Mechanics I. Professor Seaton.

This course discusses the behavior of materials subjected to tension, compression and shear; riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of simple and continuous beams and cantilevers; bending moments and shear forces in beams; design of beams of wood, steel and reinforced concrete; design of built-up beams and box girders; resilience of beams; stresses in columns and hooks; and the design of columns of wood, steel and reinforced concrete. Texts: Boyd's *Strength of Materials* and Hool's *Reinforced Concrete Construction*, Vol I. *Cambria Steel* is used for reference.

115. APPLIED MECHANICS E-II RECITATION. Class work, six hours. Three semester credits. Prerequisite: Applied Mechanics I. Professor Seaton.

Behavior of materials subjected to tension, compression and shear riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of simple beams; design of beams of wood, steel and reinforced concrete; stresses in columns and hooks; and the design of columns of wood, steel and reinforced concrete. Text, Boyd's *Strength of Materials*. *Cambria Steel* is used for reference.

120. APPLIED MECHANICS II OR E-II LABORATORY. Laboratory work, six hours. One semester credit. Must accompany or follow Applied Mechanics II or E-II Recitation. Professor Seaton.

Tension, compression, shear and bending tests are made on specimens of iron, steel, wood and concrete. These include standard commercial tests and tests to determine the elastic properties of the materials. Torsion tests are also made on steel shafting. Standard tests are made on fine and coarse aggregates for concrete, and on brick.

130. HYDRAULICS RECITATION. Class work, six hours. Three semester credits. Must accompany or follow Applied Mechanics I. Assistant Professor Pearce.

A study of fluid pressure, stresses in containing vessels and pipes, center of pressure, immersion and flotation; Bernoulli's theorem, with applications; flow through orifices, weirs, short and long pipes; loss of head due to various causes; flow of water in open channels, and its

measurement; Kutter's formula; impulse and reaction of a jet; elements of water power, impulse wheels, reaction turbines and centrifugal pumps. Text: Daugherty's *Hydraulics*.

135. **HYDRAULICS LABORATORY.** Laboratory work, six hours. One semester credit. Must accompany or follow Hydraulics Recitation. Professor Seaton.

Tests to determine the coefficients of weirs and orifices; use and calibration of water meters; tests to determine loss of head in pipes due to various causes; and tests on water wheels, water turbines, rams and pumps.

155. **ENGINEERING DRAWING.** Drafting, supplemented by lectures and recitations, twelve hours. Two semester credits. Assistant Professor Pearce.

Instruction is given in the selection and use of drawing instruments, construction of geometrical figures, lettering, orthographic projections, and pictorial methods of representation. Text: French's *Engineering Drawing*.

158. **DESCRIPTIVE GEOMETRY.** Drafting practice with lectures and recitations, twelve hours. Two semester credits. Prerequisite: Engineering Drawing. Assistant Professor Pearce.

In this course, which is a continuation of Engineering Drawing, more advanced problems, involving the point, line, and plane; the intersection and development of the surfaces of geometric solids; single-curved, double-curved and warped surfaces, with their sections, tangents and tangent planes; as well as the practical applications of the principles involved, are studied. Emphasis is laid on developing the student's ability to visualize drawings in the third angle.

161. **MECHANICAL DRAWING I.** Drafting, with lectures and recitations, twelve hours. Two semester credits. Prerequisite: Engineering Drawing. Assistant Professor Pearce.

A study is made of conventional representations, working drawings, modern drafting room systems, and the reproduction of drawings. Additional practice is given in the inclined Gothic and Reinhardt systems of lettering. Working drawings, both detail and assembly, are made from assigned plates. Special emphasis is given to the proper selection of views to present the necessary information in convenient forms, dimensioning, checking for errors, and the subject matter and arrangement of titles and notes. Text: French's *Engineering Drawing*.

170.—**MECHANICAL DRAWING II.** Drafting, eighteen hours. Three semester credits. Prerequisites: Mechanical Drawing I. Kinematics (Ap. Mech. 180) must accompany or precede this course. Assistant Professor Pearce.

About one-half of the time is occupied in making free-hand sketches of simple machine parts and complete working drawings from these sketches without further reference to the objects. At least one drawing is traced, and a blue print made from the tracing. The remainder of the semester is devoted to kinematic problems, including belting, cams, linkages and gears to fulfill specified conditions. Center line drawings are first made, embodying the solution of the problems, and upon these are built working drawings of the machine parts. An effort is made to follow standard practice in the design of those details usually determined by empirical methods. Displacement and velocity diagrams are drawn for linkages and cams.

180. **KINEMATICS.** Lectures and recitations, six hours. Three semester credits. Prerequisites, if taken for credit: Plane Trigonometry, Descriptive Geometry. Persons not taking the work for credit may be assigned to it without these prerequisites, by permission from the head of the Department. Assistant Professor Pearce.

An analysis of the motions and forms of the parts of machines constitutes this course. Among the subjects discussed are: bearings, screws, worm and wheel, rolling cylinders, cones, and other surfaces; belts, cord and chains, levers, cams and linkwork, with the velocity and motion diagrams; quick returns, straight-line motions, and other special forms of linkages; wheels in trains; curves for gear teeth. The solution of a large number of graphical and mathematical problems is required in this course. Text, Schwamb and Merrill's *Elements of Mechanism*.

ELECTRICAL ENGINEERING

Professor REID
Assistant Professor FENTON

170. ELECTRICAL MACHINERY AND CONSTRUCTION. Freshman year, first and second semesters. Laboratory work, twelve hours. Two semester credits. Professor Reid and Assistant Professor Fenton.

This is an introductory course in applied electricity. About one-half the time is devoted to acquainting the student with the various modern methods of interior wiring, approved by the National Board of Fire Underwriters, including open, cleat wiring, knob and tube-concealed wiring, flexible and rigid iron-pipe conduit, and metal molding. The wiring "code" is used as a reference in this part of the course, and on its completion the student should be competent to plan, lay out and install the wiring for the usual residence or business building.

The remainder of the time is devoted to the installation, care, operation and repair of electrical machinery. It includes armature winding of direct- and alternating-current motors and generators; the diagnosis and location of faults—short circuits, open circuits, grounds—and the repair of these various types of electrical machine troubles. It also includes the installation and connection of motors, generators, meters, compensators, and other of the usual types of electrical apparatus.

FARM ENGINEERING

Assistant Professor SANDERS
Assistant SMITH

116, 117. TRACTORS AND TRUCKS. Lectures and recitations, four hours; laboratory practice, six hours. Three semester credits.

A study is made of the selection, care, and repair of traction engines.

125, 126. FARM MOTORS. Lectures and recitations, four hours; laboratory practice, six hours. Three semester credits.

This course is designed to teach the operation, care, and repair of stationary gas engines, oil engines, and steam engines. Some time is also devoted to automobile details, including automobile motors, carburetors, transmission systems, differentials, clutches, and starting systems.

MANUAL TRAINING AND SHOP PRACTICE

Instructor LYNCH
Instructor JONES
Instructor GRANT
Instructor PARKER
Instructor BUNDY
Instructor AIMAN

Assistant GRANELL
Assistant STROM
Assistant WINTER

105. WOODWORK I. Laboratory, six hours. One semester credit. Mr. Parker, Mr. Aiman.

This is a beginning course designed to give practice with the wood-working bench tools on the various woods, and to teach the proper methods of finishing woods with stains, varnish, paint, etc. Considerable emphasis is placed upon the proper use and care of tools.

119. **MANUAL TRAINING FOR PRIMARY GRADES.** Laboratory, twelve hours. Two semester credits. Mr. Parker.

The work of this course is planned to meet the need of teachers of primary work. Exercises suitable for the pupils of the various grades are made by the class and a brief study is made of suitable materials and equipment. The work includes paper folding and cutting, cardboard construction, raffia, cord work, weaving, reed work, and elementary tool work in woodworking.

120. **WOODWORKING FOR GRAMMAR GRADES.** Laboratory, twelve hours. Two semester credits. Mr. Parker and Mr. Aiman.

This is a course in elementary woodworking planned primarily for the teacher of the upper grades. The work consists of simple, useful problems which brings into use the common woodworking tools. Various woods are used so as to acquaint the student with different kinds of lumber. The finishing consists of staining, filling, and waxing. Considerable emphasis is laid upon the use and care of tools.

125. **WOODWORKING I FOR HIGH SCHOOLS.** Laboratory, twelve hours. Two semester credits. Mr. Parker and Mr. Aiman.

This is a continuation of grade woodwork, the work being of such a nature as to require previous experience with tools. The early part of the course consists of useful problems in elementary furniture construction, a brief study of common woods and methods of finishing them, including staining, filling, waxing, varnishing and rubbing. During the latter part of the course the various woodworking machines are discussed, demonstrated, and instructions given in using them, after which enough work is given to enable the student to operate the woodworking machines.

130. **WOODWORKING II FOR HIGH SCHOOLS.** Laboratory, twelve hours. Two semester credits. Mr. Parker and Mr. Aiman.

This is a course in advanced cabinet construction, with the use of woodworking machinery and such bench work as is necessary for the assembling and finishing of the problems being constructed. A study is made of the progressive steps or operations in order that a proper use may be made of time. Instruction is given in the use and care of woodworking machinery and in staining, filling, varnishing, rubbing and finishing the problems constructed.

135. **WOODTURNING.** Laboratory, twelve hours. Two semester credits. Mr. Parker and Mr. Aiman.

This course is designed to prepare teachers for teaching wood turning in high schools. The work includes typical application of tools and processes, in turning between centers, on faceplates, and by means of hollow chucks. Exercises are given in turning cylinders, cones, beads, convex and concave surfaces, after which articles are made from drawings which have a practical application in a student's home or social life, such as handles, mallets, rolling pins, circular boxes with covers, Indian clubs, dumb-bells, napkin rings, bowls, towel rings, typical vase forms, cups, goblets, frames, ornamental stools, etc. While many of these articles are made from blue prints, it is the aim to have the students make some object of value from his own design, both as a project in turning and as a practical lesson in designing.

141. **FARM SHOP PRACTICE.** Laboratory, eighteen hours. Three semester credits. Mr. Jones and Mr. Lynch.

This course is designed for those who wish to prepare themselves for teaching in accordance with the Smith-Hughes Act. The course consists of blacksmithing closely related to farm work, babbiting, soldering, belt lacing, thread cutting with hand dies and taps, drilling and drill grinding.

146. **FARM WOODWORK.** Laboratory, eighteen hours. Three semester credits. Mr. Parker and Mr. Aiman.

This practical course is designed for the training of teachers to handle problems in connection with carpenter work on the farm. It consists of rafter cutting and erection, studding and siding work, making window and door frames, hanging doors, and similar operations on full-size construction work. Bills of material are made in all cases before each exercise is started. Exercises are given in saw filing, tool sharpening, and the general care and upkeep of tools.

150. **FORGING I.** Laboratory, six hours. One semester credit. Mr. Lynch and Mr. Granell.

In this course the field of hand-forging as related to high-school work is covered. The work includes practical exercises in making articles of use, which involve the operations of drawing, upsetting, welding, twisting, splitting and shaping. Sufficient instruction is given in the forging of tool steel to enable the worker to forge, harden and temper many of the tools which are needed in this and other branches of manual training.

Tools required: One pair five-inch outside calipers, one two-foot rule, one ball-peen hammer, weight about two pounds, including handle.

155. **FORGING II.** Laboratory, six hours. One semester credit. Mr. Lynch and Mr. Granell.

Advance work is given in the forging of iron and in the manufacture of tools, such as punches, chisels, drills, scrapers and hammers. Instruction is given in the proper methods of heating, forging, hardening, tempering, annealing and working the various kinds of tool steel and in the casehardening of mild steel.

Tools required: Same as in Forging I.

160. **FOUNDRY PRACTICE.** Laboratory, six hours. One semester credit. Mr. Grant.

Practice is given in floor, bench, and machine molding, in core making, and in casting in iron, copper, brass, and special alloys. A study is also made of modern foundry construction, equipment, materials, and methods.

170. **MACHINE TOOL WORK I.** Laboratory, twelve hours. Two semester credits. Mr. Jones and Mr. Bundy.

This course includes both bench and machine tool work, in which practice is given in chipping, filing, shaper and planer work, scraping, drilling, cutting, right- and left-hand and multiple threads, and knurling on the lathe. Practically all of the work is upon parts of machines that are being built in the shops.

Tools required: A four-inch scale, or B. & S. slide caliper rule, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, one B. & S. center gauge.

186. **FORGING III.** Laboratory, six hours. One semester credit. Mr. Lynch and Mr. Granell.

Special work is given in the forging of iron and steel to impart skill in the different operations. Some practice is given in the making of ornamental iron work. Tools required: Same as for course 150.

192. **MACHINE TOOL WORK II.** Laboratory, six hours. One semester credit. Mr. Jones and Mr. Bundy.

This course consists of progressive problems in turning and calipering, boring, reaming and taper turning and threading on the lathe, exercises in chucking, the use of forming tools, practice on the key-seating machine, and the making of a spur gear on the milling machine.

Tools required: Same as in Machine Tool Work I.

193. **MACHINE TOOL WORK III.** Laboratory, six hours. One semester credit. Mr. Jones and Mr. Bundy.

This course takes up work on the turret lathe and boring mill; lacings and methods of belt connections, compound and differential indexing, and the cutting of spiral gears on the milling machine.

Tools required: Same as in Machine Tool Work I.

SPECIAL COURSES

IN AUTOMOBILES, TRACTION ENGINES, CARPENTRY, FOUNDRY, BLACKSMITHING, AND MACHINE SHOP WORK.

To meet the need of those who wish to gain practical knowledge of the trades related to engineering, the courses described below will be offered beginning June 7 and continuing to the end of the Summer Session. A student pursuing one of these courses will have to devote about 40 hours a week to actual work in the shop and laboratory, and will be expected to pay the following laboratory fees: Automobile mechanics, \$18 a month; tractor operators, \$18 a month; blacksmiths, \$18 a month; machinists, \$18 a month; carpenters, \$9 a month; and foundrymen, \$9 a month. Besides these laboratory fees, an incidental fee of \$5 will be charged for entrance, as will be a sick benefit fee of \$1, which entitles the student to free medical attention from the College physician.

The College reserves the right to change the schedule of fees at any time without previous notice.

AUTOMOBILES. The course in automobiles includes a thorough study of the construction and assembly of four-, six-, and eight-cylinder engines; the operation, testing and adjustment of these engines; electric ignition, starting and lighting systems; the automobile chassis, including transmission systems and differentials; tire repairs; general repairing, overhauling and operation of automobiles; and sufficient shopwork to enable the student to make essential repairs.

Extensive equipment is available, including many types of cars and engines, machine tool tire-repair equipment, and electrical equipment. All grades of work will be given; the garage mechanic may supplement his knowledge with advanced and specialized work; or the amateur may begin at the bottom and obtain a comprehensive knowledge of the whole field.

TRACTION ENGINES. The tractor course covers thoroughly the construction, operation, and adjustment of all kinds of tractors and their equipment; stationary gas engines; power farm machinery, including tractor hitches; shop work.

About 20 tractors and 35 stationary gas engines are available for the laboratory work in this course, besides great numbers of smaller items of equipment in the way of magnetos, carburetors, and other attachments.

CARPENTRY. A practical study is made of general carpenter work, including the use of carpenters' tools, reading of drawings and blue prints, hand work and machine work, framing, building construction, and form building for concrete.

MACHINE SHOP WORK. The course in machine tool work is designed to meet the demands of those who must prepare themselves in a short time for this line of work. The work is suited to the needs of the individual student. The entire machine shop of the College is available for this course, which includes a thorough training in the manipulation of lathes, planers, drill presses, boring mills, shapers, and screw machines.

In order to enable the students to become familiar with both tools and shop processes, the construction of standard gasoline engines and wood lathes is followed from the machining of the rough castings to the assembly of finished parts. Students may in this way make their own engines and lathes.

FOUNDRY PRACTICE. This course is intended to train practical molders, and includes bench molding with a great variety of patterns, experience with different kinds of sands and facings; open sand work, sweep molding, machine molding, core making; setting of cores, gates and risers; different methods of venting; also general foundry practice.

BLACKSMITHING. A practical course is given in forging operations, such as drawing, welding, bending, twisting, punching, care of forge fire; the making of various tools, such as punches, chisels, drills, scrapers, hammers; hardening, tempering, annealing, case and pack hardening, tool forging, oxyacetylene and thermit processes of welding.

A student entering any branch will devote his entire attention to the work in which he is most interested or for which he is best prepared. He will be given practical instruction by efficient teachers, completely mastering each step before proceeding to the next. He will work with the machines themselves, studying the construction, operation and adjustment of every part until he thoroughly understands it. The courses are so arranged that the student will have much individual attention from the instructor, though the development of initiative will not be neglected.

Division of Home Economics

HELEN B. THOMPSON, *Dean*

APPLIED ART

Assistant EVERHARDY

101. DESIGN. Class work, three hours; studio work, nine hours. Three semester credits. Assistant ———.

A study is made of the principles which control the use of color and the selection and arrangement of elements in the production of objects themselves and in their uses as parts of a whole. Many exercises are given in which clothing and home furnishings are scored as to design. A natural motif is adapted to material, function, and form.

102. PUBLIC SCHOOL DRAWING I. Class work, two hours; studio work, six hours. Two semester credits. Assistant ———.

This course presents representation, color, design, construction work, and picture study for rural and grade schools.

104. PUBLIC SCHOOL DRAWING II. Class work, two hours; studio work, six hours. Two semester credits. Prerequisite: Course 102. Assistant Everhardy.

An advance course is given in representation and design.

114. INTERIOR DECORATION AND FURNISHING. Class work, two hours; studio work, twelve hours. Three semester credits. Prerequisite: Design. Assistant Everhardy.

This is a study of color, form and arrangement of home furnishings. Wall coverings, carpets, pictures, furniture, etc., are discussed and studied so that the student may recognize and appreciate what is appropriate and beautiful. A study is made of fine arts, of handicrafts, and of the history of furnishings. Problems in spacing and coloring of side walls are discussed and are developed in water color and decorating materials.

CLOTHING AND TEXTILES

Instructor FECHT

Assistant ———

101. CLOTHING I. Class work, two hours; laboratory, six hours. Two semester credits. Miss ———.

The aim of this course is to study the historical development of dress and discuss sewing equipment, appropriate materials of cotton and linen for undergarments, the care and repair of clothing, and the elementary principles of dress design.

Laboratory.—In the laboratory problems dealing with garment construction are dealt with, the nature of the problem being dependent upon the preparation of the student.

106. COSTUME DESIGN. Laboratory, twelve hours. Two semester credits. Prerequisite: Design. Miss ———.

A study of art in dress, comprising the application of the principles of color, harmony and design, individual requirements in color and line, comparative design of ancient and modern costumes, original problems in designs for embroidering, sketching of costumes in pencil, pen and ink, and water colors. This course is directly related to the construction of garments.

124. CLOTHING III. Laboratory, twelve hours. Two semester credits. Prerequisite: Clothing I, or its equivalent. Miss ———.

This course emphasizes the artistic in lines and decoration, deals with the design and adaptation of materials for individual and occasion, and lays stress on self-expression through dress. Commercial patterns are used. Practice in cutting, fitting, and different finishes is represented. Students are, also, requested to bring garments for remodeling. In this way materials which are usually discarded may be utilized, thus promoting economy and thrift.

211. MILLINERY. Class work, two hours; laboratory, six hours. Two semester credits. Miss ———.

This course includes a discussion of practical and artistic principles of millinery. Attention is given to taste and economy in the selection of hats. Renovation and the use of old materials is considered.

FOOD ECONOMICS AND NUTRITION

Dean THOMPSON
Assistant Professor PITTMAN
Instructor SKINNER

102. SCHOOL LUNCH PROBLEMS IN THE RURAL SCHOOL. Class work, two hours; laboratory, six hours. Two semester credits. Miss Skinner.

This course includes the selection and arrangement of equipment suitable for preparing hot lunches in rural schools; the principles of hygiene to be observed in preparation and serving of the lunches; menu planning and the nutritive requirements of growing children which should be kept in mind to insure proper selection of food.

Laboratory—The preparation and serving of simple hot lunches together with the examination and use of equipment adapted for preparing rural school lunches form the basis of the laboratory work.

106. FOODS II. Class work, six hours; laboratory, twelve hours. Five semester credits. Prerequisites: Organic Chemistry, Foods I or its equivalent. Assistant Professor Pittman.

This course emphasizes the classification, composition, occurrence and general properties of foodstuffs. Food values in relation to cost are considered, together with the legal and sanitary aspects of food products handled in commerce.

Laboratory.—Food products are handled in experiments which demonstrate the presence of the proximate principles and the various inorganic constituents, the changes they undergo in cooking, and their nutritive value as affected by admixture with other food materials. Compilation of recipes. Practice in judging food preparations.

112. HUMAN NUTRITION. Lectures and recitations, six hours. Three semester credits. Prerequisites: Organic Chemistry, Embryology and Physiology, and Foods II. Dean Thompson.

This course comprises a study of the special characteristics and nutritive functions of the food constituents; the methods of investigation which have established the quantitative basis in dietetics; the digestive and metabolic processes and products with emphasis upon energy relations; the quantitative relations of the ash constituents; nitrogen and mineral balances; comparative economy in nutrition and growth of different types of food materials.

241. SPECIAL INVESTIGATIONS IN FOODS, I. One to three semester credits. Hours to be arranged. Open to senior and graduate students. Assistant Professor Pittman.

Special problems are assigned to students for individual consideration.

246. INVESTIGATIONS IN FOOD ECONOMICS AND NUTRITION, I. From two to five semester credits, depending upon the nature of the problem. Conferences, laboratory work, and reports. Open to senior and graduate students. Dean Thompson.

The work of this course may consist of an assigned problem in the nutritive value of foods; a feeding experiment, dietary studies or practice in the methods commonly used in the simpler experiments in nutrition.

HOUSEHOLD ECONOMICS

Professor KNEELAND
Instructor SKINNER

106. HOUSEHOLD MANAGEMENT. Class work, four hours. Two semester credits. Prerequisite: Foods II or equivalent. Professor Kneeland.

This course includes a study of the evolution of the home and its present functions and problems; the organization and simplification of housework through efficient methods of housekeeping and arrangement of equipment and through the use of labor-saving devices; problems of household service; experiments in coöperative laundering, cooking, cleaning, etc.; the expenditures of the household and household budgets and accounts; the use of time freed from housework.

116. PRACTICE COURSE IN HOUSEHOLD MANAGEMENT. Three semester credits. Prerequisite: Foods II or equivalent. Prerequisite or parallel: Household Management. Professor Kneeland.

This course is conducted in the practice house. The students live in a group and perform the usual household tasks, including marketing, planning, cooking and serving meals, caring for the rooms, planning the household budget and keeping the accounts.

Students who wish to qualify as teachers under the Smith-Hughes requirements for vocational high schools are required to take this course.

221. INSTITUTIONAL MANAGEMENT I. Class work, two hours; laboratory, twelve hours. Three semester credits. Prerequisite: Foods II or equivalent. Miss Skinner.

This course deals with the food problems of institutions and includes the study of marketing, preparation of food, arrangement of menus and methods and cost of service, for different types of institutions.

Laboratory.—Practical experience in the cafeteria of the department and investigation of the food problems of other institutions are included in the laboratory work.

Division of General Science

J. T. WILLARD, Dean

BACTERIOLOGY

Professor BUSHNELL

101. GENERAL MICROBIOLOGY. Class work, two hours; laboratory, twelve hours. Three semester credits. The course is designed primarily for teachers, but students in General Science and in Agriculture may obtain credit in this course by special arrangement with the head of the department.

This course consists of a general survey of the subject of bacteriology as related to agriculture, sanitation, the preparation and care of food, etc. Some attention is also given to the method of isolation, cultivation and study of microorganisms. The student becomes somewhat familiar with methods used in the bacteriological analysis of water, milk, etc.; sterilization, sources and modes of infection by pathogenic bacteria, and means of controlling their distribution.

121. HOUSEHOLD MICROBIOLOGY. Class work, six hours; laboratory, twelve hours. Five semester credits.

This course is especially arranged for students taking domestic science. The credit received in this course is equivalent to that given for the regular college course. Students wishing to take this course should consult the head of the department before entering. See general catalogue for description of work offered, course 121.

301. RESEARCH BACTERIOLOGY. Elective. Credit to be arranged. Prerequisite: The student must have credit in at least two of the outlined courses offered by the department.

Advanced students showing sufficient training, ability, and interest in original research may be admitted to this course, upon approval of the head of the department. The student will be under the direct supervision of a faculty member of the department, and in consultation with him the subject for investigation will be chosen and outlined.

BOTANY

Instructor HAYMAKER
Instructor DALBEY
Assistant CASHEN

101. GENERAL BOTANY I. Class work, two hours; laboratory and library work, twelve hours. Three semester credits. Prerequisite: High School Botany.

This is a course of lectures, combined with special study of a required text, with reference reading. The principal life functions of plants, responses of plants, such as photosynthesis, digestion, respiration, transpiration and growth, and the responses of plants to environmental conditions and physical stimuli, are studied. The anatomy of the plant, in so far as it relates to the functions concerned, will be studied in some detail. In this course the student gains a general introductory knowledge of the functions and reactions of plants, and learns to regard them from the dynamic standpoint, as working organisms. Text, *A Text Book of Botany for Colleges*.

Laboratory.—A series of typical experiments is followed out in the laboratory and in the greenhouse. Each student is furnished with a set of the necessary apparatus, and learns to apply quantitative methods to the study of functions. Laboratory outlines are furnished by the department.

105. GENERAL BOTANY II. Class work, two hours; laboratory and library work, twelve hours. Three semester credits. Prerequisite: General Botany I.

A careful study is made of the morphology of the chief great groups of plants, of their physiology and ecology, of the classification and geographic distribution of the plant kingdom, and its economic relation to man. The latter part of the course is devoted to a systematic study of some of the more important plant families in which their floral structures are considered. Some time is given to the tracing out of unknown plants by means of a key.

Laboratory.—The aim of the laboratory in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity, and of their probable relations to one another as parts of an evolutionary series. Laboratory outlines are furnished by the department. Text, *A Text Book of Botany for Colleges*.

116. ECONOMIC PLANT DISEASES (PLANT PATHOLOGY I). Class work, two hours; field, laboratory and library work, twelve hours. Three semester credits. Prerequisite: General Botany II. Mr. Haymaker.

The diseases affecting the chief economic crops of the field, orchard and garden are studied. Among these are the smuts of cereal and forage crops; the common rusts attacking wheat, oats, rye and barley; the apple blotch, apple scab, Illinois blister canker, brown rot of fruits; potato, tomato and bean diseases, together with many others. Methods for preventing losses brought about by plant diseases will receive considerable attention. This course is intended to make high-school teachers familiar with the common plant diseases which are causing a great annual loss in Kansas. Time will be devoted to collecting and identifying these diseases in the field. Methods of collecting, preserving and preparing plant diseases for exhibit purposes, especially for high-school work, will receive attention. Text, *Diseases of Economic Plants*, by Stevens and Hall.

152. FRUIT, VEGETABLE AND CEREAL DISEASES. Class work, two hours; laboratory and library work, twelve hours. Three semester credits. Prerequisite: Plant Pathology I. Mr. Haymaker.

This course consists of a series of lectures dealing with diseases attacking fruits, vegetables and cereals. Special attention is given to control measures. The laboratory work considers various economic diseases which have not been considered in Plant Pathology I. This course is of special interest to horticultural and agronomy students.

155. FIELD BOTANY. Class work, two hours; field, laboratory, and library work, twelve hours. Three semester credits.

The purpose of the course is to offer teachers an opportunity to become acquainted with plants in the field, their natural history, habits, distribution and relation to their environment. Excursions will be made to different localities near Manhattan, to study plants of the prairies, woods, swamps, streams, etc. Especial attention will be given to methods of collecting and preserving plants for use in high-school teaching. Part of the laboratory work will consist of determining the names of plants by means of manuals. Text, *Gray's New Manual of Botany*.

160. BOTANY FOR HIGH-SCHOOL TEACHERS. Class work, two hours; laboratory and library work, twelve hours. Three semester credits.

The purpose of this course is to give high-school teachers a method of teaching botany that will bring the subject into closer relation to the farm and its problems. It is an attempt to render possible the study of botany in a scientific sense, by the use, so far as practicable, of strictly economic plants for laboratory material. Considerable emphasis is laid on the study of plants from the natural history standpoint. Most of the larger and more important groups of plants are studied from this point of view.

CHEMISTRY

Professor KING
Associate Professor SWANSON
Associate Professor HUGHES
Associate Professor BRUBAKER
Instructor KEITH
Instructor WEST
Instructor HARRISS

101. CHEMISTRY I. Lectures and recitations, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: High-school physics. Professor King, Mr. West, Miss Harriss, Mr. Keith.

This work begins the study of general chemistry, and is designed, with that of the succeeding semesters, to give the student a knowledge of the fundamental principles of chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions, the principles of nomenclature, the significance of formulas, chemical equations, etc., much attention is given to these, while at the same time the practical uses of the substances, and the processes used in metallurgy, engineering, agriculture, and other arts are emphasized. McPherson and Henderson's *A Course in General Chemistry* is used as a textbook, this semester's work covering the first 331 pages. The text is supplemented by lectures and is amply illustrated by experimental demonstrations.

Laboratory.—As far as time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required as far as possible, to study experiments in that light. In this, as in all other laboratory work in chemistry, the objects are to illustrate chemical phenomena, and to teach care in manipulation, attentive observation, logical deduction, and discrimination and accuracy in recording results and conclusions. The student is required to give the designated amount of time, and a minimum amount of work must be satisfactorily performed in order to obtain credit. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

102. CHEMISTRY II. Lectures and recitations, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: Chemistry I. Teachers same as for Chemistry I.

The work in this course for the first half of the semester is a completion of the study of general chemistry begun the preceding semester. The second half of the semester is devoted to the study of the general principles of qualitative analysis as outlined in an *Elementary Treatise on Qualitative Analysis*, by William McPherson.

Laboratory.—In the laboratory the student studies the ordinary methods of separation and detection of the more common metals, non-metals, acids, bases, and salts. The teaching of analysis as such is a secondary object, although the student is held to the exact observation and careful reasoning required in ascertaining the composition of single substances and mixtures. The effect of the course is to broaden, strengthen, and unify the students' ideas of general chemistry.

120. ORGANIC CHEMISTRY. Lectures and recitations, four hours; laboratory, six hours. Three semester credits. Prerequisite: A college course in general chemistry. Associate Professors Hughes and Brubaker, and Mr. West.

A systematic study is made of the simpler examples of the more important classes of organic compounds in their logical chemical relations. Such substances as touch the everyday affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soaps, sugars, starch, proteins, and

other less-known substances. Compounds used for clothing, fuel, light, antiseptics, disinfectants, anæsthetics, poisons, medicines, solvents, etc., are included. While especial attention is given to the useful organic compounds, the study of others is not excluded, when they contribute to an understanding of the systematic relations existing among the several groups. Any serious study of the biological sciences, or of the arts connected with them, must require this as a foundation, and a knowledge of the properties of organic compounds finds frequent application in engineering as well. The subject is amply illustrated by experiments in the lecture room. Text: Norris's *Organic Chemistry*, in part, accompanied by lectures amplifying certain parts of the subject.

Laboratory.—The laboratory work includes experiments and preparations touching the more important compounds studied in the lectures and recitations, especially fats, carbohydrates and proteins.

121. ORGANIC CHEMISTRY HE. Lectures and recitations, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: A college course in general chemistry. Associate Professor Hughes.

A systematic study is made of the simpler examples of the more important classes of organic compounds in their logical chemical relations. Such substances as touch the everyday affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soaps, sugars, starch, proteins, and other less-known substances. Compounds used for clothing, fuel, light, antiseptics, disinfectants, anæsthetics, poisons, medicines, solvents, etc., are included. Text: Norris's *Organic Chemistry*

Laboratory.—The laboratory work includes preparations and qualitative and quantitative experiments touching the more important compounds studied in the lectures and recitations. Especial emphasis is placed on the organic compounds found in fuels, foods, fabrics, disinfectants, and other materials used in and about the home. Laboratory guide, *Experiments in Descriptive Organic Chemistry*, by Alice F. Blood.

150. QUANTITATIVE ANALYSIS I. Laboratory, six hours. Two semester credits. Prerequisites: Chemistry I and II. Associate Professor Brubaker.

This course is planned to give the student a knowledge of the simpler operations in gravimetric analysis and volumetric analysis and to lay the foundation for studies in which such knowledge is required. Particular emphasis is laid on the importance of exact quantitative work and its value in investigations connected with agriculture. Textbook: *Notes on Quantitative Chemical Analysis*, by C. W. Folk.

206. PHYSICAL CHEMISTRY. Lectures and recitations, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: Chemistry II or Chemistry HE-II. Professor King.

This course is especially adapted to meet the needs of students intending to specialize in soils, as well as those students in other divisions who desire a broader knowledge of the more fundamental laws of chemistry. In this course emphasis is placed upon the study of gas laws, osmotic pressure, surface tension, solution, colloidal solutions, thermochemistry, equilibria, and electrical conductors.

Laboratory.—In the laboratory the subject matter discussed in the lectures is investigated experimentally.

218. ORGANIC CHEMISTRY I. Lectures and recitations, four hours; laboratory, twelve hours. Four semester credits. Prerequisite: College course in organic chemistry. Associate Professor Hughes and Mr. West.

This course includes a careful, systematic study of aliphatic and aromatic compounds to such an extent as time permits. Text: Perkin and Kipping's *Organic Chemistry*.

Laboratory.—The laboratory work includes preparation and purification of a number of compounds selected from the aliphatic and aromatic series for the illustration of important synthetic reactions. In addition to the verification of the constants of these compounds the important qualitative tests are made which are characteristic of the classes of compounds. Laboratory guide: Jones's *A Laboratory Outline of Organic Chemistry*.

223. ORGANIC PREPARATIONS. Laboratory work, thirty hours. Five semester credits. Prerequisite: Organic Chemistry II. Associate Professor Hughes.

The compounds prepared in this course are so chosen as to give the student a thorough knowledge of the fundamental principles of synthetic organic chemistry.

234. BIOCHEMICAL PREPARATIONS. Laboratory work, thirty hours. Five semester credits. Prerequisite: Organic Chemistry II and Physiological Chemistry I. Associate Professor Hughes.

This course includes the isolation, purification, and analysis of a number of compounds which are of importance in biochemistry and nutrition.

241. QUANTITATIVE ANALYSIS. Class work, one hour; laboratory, twenty-four hours. Five semester credits. Prerequisite: Chemistry II or its equivalent. Associate Professor Brubaker.

The subject matter considered in this course is practically the same as that given in courses 250 and 251.

256. CHEMICAL RESEARCH. Excellent opportunities are offered students to undertake research work in chemistry. Such work is constantly being conducted in the laboratories of the department in connection with the Agricultural and Engineering Experiment Stations. The State food laboratory and the laboratories for analysis of feeds and fertilizers are also accessible to students desiring research along such lines. Much emphasis is placed upon research in the department, and all students whose training is adequate are encouraged to participate. Work is offered in the following lines:

Agricultural Chemistry. Associate Professor Swanson.

Applied Analytical Chemistry. Associate Professors Newman and Brubaker, and Assistant Professor Latshaw.

Applied Organic Chemistry.

Biochemistry. Associate Professor Hughes and Assistant Professor Hogan.

Applied, General, and Physical Chemistry. Professor King.

257. FOOD ANALYSIS. Laboratory work, eighteen hours. Three semester credits. Prerequisites: Organic Chemistry and Quantitative Analysis I. Associate Food Analyst Campbell.

This course includes the quantitative methods employed in the analysis of the various kinds of foodstuffs. It also includes practice in testing for the presence of adulterants, preservatives, and coloring materials.

ECONOMICS AND SOCIOLOGY

Associate Professor MERRITT

101. ECONOMICS. Class work, six hours. Three semester credits. Associate Professor Merritt.

The fundamental principles of the science are studied and discussed in their relation to current economic problems, not as mere questions of the day but as phases of still larger problems in the evolutionary progress of economic society. The course deals with the several stages of economic development through which man has passed down to and including the ideals underlying the New Industrialism. The theory and progress of

social control; price fixing by authority; business cycles; the railway problem; capitalistic monopoly; economic insecurity due to unemployment, industrial accidents, sickness and old age; trade unionism; money and the mechanism of exchange; rent; interest; profits, and wages are some of the topics for study and class discussion. Instruction is by lectures in combination with assigned readings, class discussions, and reports. Text, Ely's *Outlines of Economics*.

204. BUSINESS ORGANIZATION Class work, four hours. Two semester credits. Associate Professor Merritt.

This is a study of the entrepreneurial, partnership, and corporate forms of business organization and management; the advantages and disadvantages of each form, and legislative restrictions governing the same. The selling plans, advertising methods and systems used by typical manufacturing and commercial firms, credits and collections, are made the basis of study and reports. Attention is also given to the organization and operation of markets and exchanges, cost accounting, and special systems of wage payments. Instruction by recitation and class discussions based on Briscoe's *Economics of Business*

251. SOCIOLOGY. Class work, six hours. Three semester credits. Associate Professor Merritt.

This course deals with social life in general, involving a study of social origins, activities, and organization. Such social institutions as the family, the church, the school, and the state are studied as to origin, development, organization, and aims. The processes of socialization, social forces and social control receive emphasis. Consideration is given also to social pathology; poverty, its causes and remedies; crime, its causes and prevention; and to remedial legislation and correctional agencies. The aim of the course is to help the student get his social bearings, and to find himself as a fact and factor in the complex inter-relations of human society. Assigned library readings and special written reports are required. Instruction by lectures and class discussions. Text, Hayes's *Introduction to Sociology*.

260. COMMUNITY PROBLEMS. Class work, two hours. One semester credit. Associate Professor Merritt.

A study is made of the larger problems of urban and rural community life, considered from the sociological standpoint. Agencies and movements for organization, development and improvement; surveys; community centers; schools and churches; granges; agencies of public health, safety, recreation, and charity—all these are investigated. Attention is given to the methods for studying a community so that it may find and organize itself for improvement. Field work, lectures, and library work are the methods of instruction. Arrangements may be made for extended credit by doing more extended field work than is required by the course. This course is especially arranged for teachers, ministers, and others interested in community work.

EDUCATION

Professor HOLTON
 Professor KENT
 State Club Leader HALL
 Associate Professor ANDREWS
 Associate Professor PETERSON
 Assistant Professor _____
 Assistant Professor DAVIDSON

101. PSYCHOLOGY I. Class work, six hours. Three semester credits. Associate Professor Peterson.

A general introduction is here given to the forms and laws of conscious experience as based on a knowledge of the physiological conditions of mental life. The work of the course includes the study of a text, outside readings, lectures and class experiments.

105. EDUCATIONAL ADMINISTRATION I. Class work, six hours. Three semester credits. Associate Professor Andrews.

This course is a study of the organization of state, city and county schools; the interrelation of boards of education, superintendents, principals, teachers. The school law of Kansas is also studied.

109. EDUCATIONAL PSYCHOLOGY Class work, six hours. Three semester credits. Prerequisite: Psychology. Associate Professor Peterson.

The course will deal with those aspects of psychology that have a direct bearing upon educational practices. Attention will be paid to the results of experimental investigations in the field. Lectures and library work.

111. METHODS OF TEACHING. Class work, six hours. Three semester credits. Prerequisite: Psychology. Associate Professor Andrews.

The aim of this course is the development of good classroom technique through detailed study of child experiences as related to the larger demands of education. The work includes lectures, library, assignments, and observation of classes. A feature of the course is individual reports and discussions.

113. HISTORY OF EDUCATION I. Class work, six hours. Three semester credits. Associate Professor Andrews.

This course is intended to present the successive relationships that have existed between educational machinery and practices and the changing political, economic, scientific, cultural, and ideal environments from primitive times to the present.

118. EDUCATIONAL SOCIOLOGY I. Class work, six hours. Three semester credits. Professor Holton.

This course deals with the concrete objectives of education considered as a process of social adjustment; the meaning of education in a democracy; the educative functions of the home, the community, the church and the school; the school as a special environment; the meaning of labor and leisure; cultural and vocational education; intellectual and practical studies; and physical and social studies.

121. HOME ECONOMICS EDUCATION. Class work, six hours. Three semester credits. Prerequisite: Educational Administration. Assistant Professor ———.

This course offers problems dealing with the place of Home Economics in modern secondary education; the aims and phases of work in various types of schools; the organization, maintenance, equipment and supervision of such departments.

125. AGRICULTURAL EDUCATION. Class work, six hours. Three semester credits. Professor Kent.

A comparative study is made of the provisions for agricultural education in this and other states and countries and the principles underlying such education. The part played in agricultural education by community, county, state and nation is discussed. Types of schools, courses of study, adjustment of school work to community needs, and the equipment and administration of agricultural schools are studied. The aim of the course is to fit the student to plan, teach and administer or supervise agricultural work, especially in high schools.

129. INDUSTRIAL EDUCATION. Class work, six hours. Three semester credits. Prerequisite: Educational Administration. Professor Kent.

This course is a study of typical secondary schools of industrial education and departments on industrial education in public schools; of the industrial schools of Germany; of the making of a course of study in in-

dustrial education for elementary and secondary schools; of shop equipment and cost; of the pedagogy of vocational subjects.

132. SPECIAL METHODS IN THE TEACHING OF HOME ECONOMICS. Class work, six hours. Three semester credits. Assistant Professor Lloyd-Jones.

This course applies the principles of sound teaching to the selection and development of the subject matter of home economics in lessons for high-school pupils and to the conduct of laboratory and classroom exercises. It is supposed to accompany supervised observation and teaching.

136. SPECIAL METHODS IN THE TEACHING OF AGRICULTURE. Class work, six hours. Three semester credits. Assistant Professor Davidson.

Training in planning lessons, organizing materials, and conducting class and laboratory work in agriculture is the purpose of this course. The work will include observation, criticism and reports of class exercises, a study of work done in high schools, and the making and criticism of lesson plans and outlines. Special attention is given to selecting laboratory materials, conducting laboratory exercises, and adapting class and laboratory work to each other.

139. SPECIAL METHODS FOR CLUB WORKERS. Class work, two hours. One semester credit. State Club Leader Hall.

This is a course in organizing and conducting garden, corn, pig, canning, bread, garment-making and other clubs for boys and girls. Methods of organizing, financing and directing these clubs will be studied. The purpose and function of club work in the social, economic and vocational development of the child is emphasized.

201. RURAL EDUCATION. Class work, six hours. Three semester credits. Prerequisite: Educational Administration. Professor Kent.

This course deals with extension education, boys' and girls' club work, the problems of the rural school, consolidation, social centers, farmers' organizations, and all forms of organized community life in the open country. A certain amount of field work is done in connection with the course.

211. MENTAL AND EDUCATIONAL MEASUREMENTS. Class work, four hours. Two semester credits. Prerequisite: Educational Psychology. Associate Professor Peterson.

The course is designed to give a working knowledge of the fundamental principles of educational measurement and an appreciation of the significance of the measurement movement in education. A careful study is made of standard educational tests and scales, with special emphasis upon their value in the improvement of classroom methods and conditions of learning. Attention is given to such statistical methods and devices as are needed for the interpretation of data.

222. RURAL ORGANIZATION. Elective. Class work, four hours. Two semester credits. Director Burr.

Principles and projects of rural organized activities. The history and development of organizations for rural improvement and progress. The function of such organizations in promoting rural progress and welfare. A study of the organization, aims and accomplishment of typical rural or farmers' organizations.

224. RURAL LEADERSHIP. Elective. Class work, two hours. One semester credit. Director Burr.

The place and function of rural leadership in community development; how leaders are developed and how they may be used by extra-community agencies in coöperating with the community in movements for community improvement.

301. EDUCATIONAL SEMINAR I. Open to candidates for the master's degree and teachers. Class work, four hours. Two semester credits. Prerequisites: Educational Psychology, and Educational Administration. Professor Holton.

The work consists of lectures, reports and class discussions. Each member of the semina chooses a topic early in the term for special investigation. Preliminary reports are made to the class from time to time and the final results of the study are embodied in a paper.

ENGLISH

Professor MACARTHUR
Professor DAVIS
Associate Professor CONOVER
Associate Professor BURNS
Instructor —————

101. COLLEGE RHETORIC I. Class work, six hours. Three semester credits. Associate Professor Burns.

This course consists of a rapid review of the principles of sentence structure, outlining, and paragraphing, followed by a study of the elements of effective writing in prose. In connection with the course systematic training is given in the writing of expository themes.

104. COLLEGE RHETORIC II. Class work, six hours. Three semester credits. Prerequisite: College Rhetoric I. Associate Professor Conover.

College Rhetoric II continues the work of College Rhetoric I. Special emphasis is laid on expository and argumentative writing. Attention is directed to practical as well as to literary subjects for the frequent themes written throughout the course.

122. BUSINESS ENGLISH. Class work, six hours. Three semester credits. Professor Davis.

This course comprises a thorough review of business letter writing, exercises in writing contracts, notes, mortgages, wills, orders, sale bills, specifications, model story advertisements, and a practical study of other forms commonly used in connection with business.

128. ORAL ENGLISH I. Elective, first semester. Class work, six hours. Three semester credits. Prerequisite: College Rhetoric I. Associate Professor Burns.

This course of study of the principles of oral composition and practice in oral composition in the form of explanations, narrations, descriptions, selling and other business talks, travel talks and speeches for special occasions are offered. For materials for the exercises given in class, students are directed to cultural subjects, more particularly to painting, sculpture, architecture, and music.

134. METHODS OF TEACHING ENGLISH. Class work, six hours. Three semester credits. Professor Macarthur.

The teacher of English in the high school often feels the need of new methods of presenting the subject. This course considers particularly the needs of the teacher who has had special training in home economics, agriculture, manual training, or general science, but who has not had such training in English. The class work consists not only of lectures by the instructor, the interpretation of the works assigned for study, and in writing of critical essays, but of the systematic discussion of methods for presenting the classics to the pupils in the high school and of awakening in them a warm vital appreciation of the best literature and of the best conduct of composition work under the conditions met in the rural and smaller high schools. A definite program of work for the high-school year is constructed and discussed. The Department of English will accept the work of this course as a substitute for English Literature I.

140. LITERATURE FROM THE READERS. Class work, six hours. Three semester credits. Professor Davis.

This course is planned to meet the needs of teachers of rural and grade schools. The aim of the course is to stimulate the teacher's love for good literature until she becomes conscious of her power to interest, impress, and inspire boys and girls. Reading is considered both as a fundamental means of acquiring knowledge and as a stepping stone to the appreciation of the world's best literature. Special emphasis is placed upon teaching children how to study the reading lesson, and upon the necessity to use in the reading lessons more of the literature of rural life. One hour each week is devoted to special methods of teaching reading.

177. ENGLISH LITERATURE HE-I. Sophomore year, both semesters. Class work, six hours. Three semester credits. Prerequisite: College Rhetoric II. Associate Professor Conover.

This course consists of special studies of narrative, lyric, and dramatic poetry, the novel, and the essay. The students are made familiar with the principles of literary appreciation and are taught to apply them in intensive reading and study of standard selections.

180. ENGLISH LITERATURE HE-II. Class work, six hours. Three semester credits. Professor Davis and Associate Professor Conover.

A general survey of English literature from the earliest times are offered on the history of English literature from the earliest times to the present day. In addition, works of representative authors of each period are assigned for reading outside of the classroom. These are discussed in class and passages from them interpreted.

271. THE ENGLISH BIBLE I. Class work, six hours. Three semester credits. Professor Macarthur.

This course familiarizes the student with the different kinds of literature found in the English Bible. A careful study is also made of the style of that great classic in order to discover the secrets of its simplicity, clearness, and power.

HIGH SCHOOL DEBATE AND ORATORY. Class work, three hours. Associate Professor Burns.

This course comprises a thorough drill in coaching high school debates and in teaching debating in the high school. Special assistance will be given to teachers who desire to collect and to prepare material for high-school debates. The debating files of the College will be available for students taking this work.

SHORTHAND. Class and laboratory drills, six hours. Miss West.

Special instruction in shorthand and practical drills in application will be given to students and teachers desiring to prepare themselves as stenographers or to acquire rapid facilities for note taking. Stenographers desiring to increase their accuracy and speed in note-taking, as well as students desiring to enter upon this study and drill for the first time, will be admitted to the course by special arrangement with the instructor in charge.

TYPEWRITING. Class and laboratory drills, six hours. Miss West.

Special laboratory instruction and drill will be given in typewriting. Typewriting from stenographic notes, from rapid dictation and from the dictaphone, as well as expert drill in multiple copying, stencil cutting and duplication, will comprise leading features of the course.

NOTE: If ten or more teachers desire a thorough course in grammar, the course will be offered.

ENTOMOLOGY

Assistant Professor MERRILL

101. GENERAL ENTOMOLOGY. Class work, four hours; laboratory, six hours. Three semester credits. Prerequisites: General Zoology I and II, or equivalent. Associate Professor Tanquary.

This is a study of the elementary anatomy and physiology of insects, complete enough to give a thorough understanding of the life history and habits of the most important species, and the general principles upon which the control of these economic forms is based. It is a study of the more important general facts about insects as a class; the main characters of the different orders and groups; how they become fitted to survive and multiply; and how the structure and habits of one group render it susceptible to certain measures of control, while in other groups entirely different measures are necessary. Field work forms a limited part of the course.

111. APICULTURE. Class work, four hours; laboratory, six hours. Three semester credits. Assistant Professor Merrill.

This course comprises a general study of the structure, life history, general behavior, activities and products of the honey-bee. Special attention is given to practical beekeeping, dealing with the best methods practical among beekeepers. A study is made of bee diseases and of the standard methods to be used in the eradication and control of them. A study is also made of the relation of bees to agriculture and horticulture.

228. ADVANCED APICULTURE. One to three semester credits, depending upon the amount of work done. Assistant Professor Merrill.

This course is open to those who have had Entomology III, Apiculture, or its equivalent. The work is largely individual and is outlined to suit the need of persons registering for the course. Advanced and special work only is given.

HISTORY AND CIVICS.

Professor PRICE
Associate Professor ILES
Associate Professor JAMES
Instructor OREM

56. MODERN HISTORY II. Class work, seven and one-half hours. Four semester credits in the School of Agriculture, or the last half unit of Modern History for College entrance. Miss Orem.

This course is designed to set forth the history of Europe since the Thirty Years' War. The rise of Prussia and of Russia, the decline of Spain, the ascendancy of France, the great Revolution, the Napoleonic empire, are the chief subjects for study during the early part of the course. The latter part is given over to a study of the growth of nationalities in the nineteenth century, special attention being directed toward the social, political and economic developments of the period, as well as to the international relations, all with the object of making clear in some degree the causes operating to bring about the recent World War. The larger part of this course is devoted to the last hundred years. The results and effects of the World War, including territorial changes, and the League of Nations, are carefully studied. The text used will be Robinson and Beard's *Outlines of European History*, Part II, together with Harding's *New Medieval and Modern History*, and assigned readings.

59. AMERICAN NATION I. Class work, seven and one-half hours. Four semester credits in the School of Agriculture, or the first half-unit of American History for College entrance. Miss Orem.

This course comprises a survey of American history from the discovery of America to the overthrow of the Federalist party in 1800. It

deals with the establishment of the English colonies in America, the growth of social and political institutions in these colonies, the development of an American nationality, the struggle among European nations for possession of North America, the divergent English and American political theories, the causes and meaning of the American revolution, the schemes for financing the Revolutionary war, the European diplomatic entanglements, the relations of the Continental Congress and the state, the efforts to solve the problem of imperial organization, the Constitutional Convention, and the Federalist organization of the new government. Along with the political history of this period goes a study of America's economic development. Texts: West's *History of the American People*, and Bogart's *The Economic History of the United States*.

60. AMERICAN NATION II. Class work, seven and one-half hours. Four semester credits in the School of Agriculture, or the second half-unit of American History for College entrance. Miss Orem.

This is essentially the course that is usually designated as American History II in the high-school curricula. It will cover the period from the election of Jefferson, in 1800, to the present time. Westward expansion, sectional differences, Kansas History, the Civil War, and especially the new industrial age, will be the points of emphasis. This course may be taken by any students whether or not they have had the first half of a high school American History course. The texts will be the same as in American Nation I.

63. CIVICS. Class work, seven and one-half hours. Four semester credits in the School of Agriculture, or one-half unit for College entrance. Associate Professor James.

This course, while designed primarily to meet the needs of teachers of civics in grammar schools and in high schools and of those preparing for college, is intended generally as a preparation for the duties of citizenship. Therefore, the emphasis is laid upon the actual workings of American Government, with the due attention to recent changes and tendencies in state and nation. The text used is Guiteau's *Government and Policies in the United States*, Kansas edition, supplemented by assigned readings.

101. AMERICAN HISTORY I (BEGINNINGS OF THE AMERICAN NATION). Class work, six hours. Three semester credits. Professor Price.

This course gives special emphasis to the industrial phases of the origin and development of American nationality and democracy to the end of the War of 1812. It also includes our constitutional and political development, especially with reference to origin, basis, cause, and effect. It aims to develop historic-mindedness; that is, training the student to put himself in the other fellow's place and understand fairly "the why." The European origin and background of American history, the evolution of colonial life, industries, and institutions; why we became an independent nation; our westward expansion; the establishing of nationality, and the development of government by the people, are phases definitely emphasized. Instruction is given by means of lectures, readings, and recitations.

121. ENGLISH HISTORY. Class work, six hours. Three semester credits. Associate Professor James.

A survey is made of the whole field of English history, with special emphasis on the modern period. The Tudor and Stuart regimes, with their bearings on constitutional and political advance and New World history, the growth and organization of the empire, the commercial and industrial revolutions, and more recent political, social and industrial developments, will be studied in as much detail as the time allows. Throughout, some notice will be taken of contemporary world history are studied in this course.

and of England's position in international affairs leading up to her part in the Great War. The course is based on Cheyney's *Short History of England* as a text, with lectures and assigned readings.

126. CURRENT HISTORY Class work, two hours. One semester credit. Associate Professor James.

The subject matter of this course varies each semester from that of any other semester. The student is guided in the study of this course by such weekly magazines as *The Independent* and *The Outlook*, supplemented by such monthly periodicals as *The Review of Reviews*, *World's Work*, *Current History*, etc. The course is designed to give the student as wide an outlook on contemporary world movements and as good an understanding of the conditions and institutions in the midst of which he lives as can be crowded into two recitation periods per week. At the same time it directs the student to good habits of news reading of the right sort.

127. TEACHERS' COURSE IN HISTORY. Class work, four hours. Two semester credits. Associate Professor Iles.

This is a seminar course of discussions based on Henry Johnson's *Teaching of History in Elementary and Secondary Schools*, together with Mace's revised work, *Method in History*, and supplemented by a study of the *Report of the Committee of Seven*, and of the Committee of Five on *History in the Secondary Schools*, and the Committee of Eight on *History in the Elementary Schools*. A critical examination is made of special books on method in history and civics, such as Wayland's *How to Teach American History*, and of special articles in the *History Teachers' Magazine*. The different texts in history and civics are critically investigated as to points of excellence or weakness, including lectures on the content or viewpoint of each. Information is also given as to the best illustrative material and helps in the teaching of history and civics. This course reveals the evolution in the writing of history, and the growing importance of history and civics in the modern school curriculum, together with the improving viewpoint as to content of both the history and the civic courses.

151. AMERICAN GOVERNMENT. Class work, six hours. Three semester credits. Associate Professor Iles.

This course in civics, or actual government, reviews definitely the fundamental principles and operations of our state and national governments, including the essential principles of constitutional law, but gives special emphasis to the actual present-day conditions and movements in our governmental and political life. Among the subjects especially studied are the initiative and referendum, suffrage and primary elections, the recall, city government and government of territories, the regulation of commerce, conservation of national resources, national defense, taxation and finance, the actual methods of congressional activity, and the function, organization, power, and importance of political parties in our government. The course is primarily based on Beard's *American Government and Politics*. Throughout this course special and definite attention is given to recent and current events in governmental activities.

152. COMMUNITY CIVICS. Class work, four hours. Two semester credits. Another hour of credit may be obtained by a limited number of students who have time to devote to special problems. Associate Professor Iles.

This course deals chiefly with the functions of government as manifested in community life. It is designed to afford a basis both in subject matter and in method for those teachers who desire to present Civics in direct relation to individual welfare. The use of local material in teaching civics is illustrated, and the structural side of government is reviewed as far as is necessary to show the means through which the functions are performed.

202. AMERICAN HISTORY II (WESTWARD EXPANSION AND SECTIONALISM). Class work, six hours. Three semester credits. Professor Price.

This course concerns itself with the industrial conditions, the issues and the leaders of the middle period of our history, from the close of the War of 1812 to the Civil War. Among the subjects investigated are the industrial and political conditions in America in 1816; the Missouri Compromise; the antislavery agitation; the Webster-Hayne debate; South Carolina nullification; annexation of Louisiana, Florida, and especially Texas; the Mexican War, and the resulting preponderance of the slavery issue; the Compromise of 1850; the Kansas-Nebraska bill and the early Kansas struggle "to the stars through difficulties," including the various constitutions and the final admission to statehood; the origin of the Republican party; the election of 1860; and the events leading immediately to the secession of the Southern States. Instruction is by means of lectures, recitations, and readings.

This course is based on Price's *American History Notebook*, printed by the state for use in the Kansas schools, and includes a careful study of the state texts in American History for both the grades and the high schools, as well as our state text on Kansas History.

223. MODERN EUROPE (SINCE 1814). Class work, six hours. Three semester credits. Associate Professor Iles.

This course traces the evolution of modern European nations since 1814, with special attention to political organization, industrial development, and colonial expansion. World readjustments, new governments and their boundaries, the League of Nations, political problems and social and economic adjustments due to the Great War are included. A desirable course for all who wish a large view and clear understanding of the Europe of to-day. Recitations, lectures, and assigned readings. Text, Hayes' *A Political and Social History of the Modern Europe*, vol. II.

AMERICAN HISTORY LECTURES. Two lectures each week. No credit. Professor Price.

These lectures cover the whole period of American History, with special consideration of our international relations, our agricultural history, the history of Kansas, and the very recent period. They are based upon the American History Notebook, printed by the state for use in the schools of Kansas. Advice is given as to the best reading references on certain phases of our history; but there are no recitations and no examinations. These lectures are helpful to those who are taking any of the courses in American History, and should prove especially helpful to all teachers of this subject, whether in the grades or in the high school. These lectures are open to any one who is properly assigned to them, but regular attendance is required, as in any course.

INDUSTRIAL GEOGRAPHY. A three-hour course in geography for teachers will be offered, provided ten or more enroll for it.

INDUSTRIAL JOURNALISM AND PRINTING

Associate Professor ROGERS
Assistant Professor KEITH

102. PRINTING PRACTICE. Laboratory practice, twelve hours. Two semester credits. Assistant Professor Keith.

A study of general printing-shop practice, including cost finding, is made in this course. The work is adapted to the needs of those taking it, but is intended particularly for high-school teachers of printing and for those who expect to have editorial supervision of publications, including high-school papers. Lectures are given on such subjects as the history of printing, artistic typographical arrangement, and the use of printing as an aid in the study of spelling, punctuation, and English composition. More advanced work will be given to students prepared for it.

107. **ELEMENTARY JOURNALISM.** Class work, four hours. Two semester credits. This course should be accompanied by Journalism Practice I to give four semester credits. Associate Professor Rogers.

This course is designed to give the students practical experience in the fundamentals of newspaper work. It is intended to prepare for more advanced courses in journalism or to give necessary training for effective use of the written articles in farm bureau, educational, and other vocational activities. Methods of obtaining news of various types, the writing of the lead, and the general style of the news story are carefully considered. The duties of the reporter and the physical, mental, and ethical demands made upon him are briefly presented. Attention is given to the history and scope of journalism.

110. **JOURNALISM PRACTICE I.** Laboratory practice, twelve hours. Two semester credits. Professor Crawford.

This course embodies actual practice in journalism, as closely approximated as possible to actual newspaper work. Students are required to gather news, both assigned and unassigned, and to write the stories in the department work room. The College campus is divided into "runs" which the students cover at regular intervals, and assignments are given at specific times as in a newspaper office. The work is adapted to the needs and qualifications of each student.

227. **JOURNALISM FOR VOCATIONAL TEACHERS.** Class work, four hours. Two semester credits. Associate Professor Rogers.

This course is offered for the purpose of meeting the demands for teachers who feel the need of special training in news writing and editing to enable them to use effective publicity in connection with the work of their schools. How to write, edit, and publish a school paper, and how to write school news that will be acceptable to local papers, are taken up in the course. Several hundred newspapers and magazines received by the Department of Industrial Journalism afford practical material. Careful attention is given to the publication of high-school papers, and problems of staff organization, editorial methods, business management, mechanical make-up, and faculty advice are discussed. A large number of high-school publications are available for use by students in the course. Actual practice on a model school paper will be required of each student taking the work.

MATHEMATICS

Professor WHITE
Associate Professor STRATTON
Instructor MCKITTRICK

53. **BOOKKEEPING.** Class work, four hours. Two semester credits in the School of Agriculture. Associate Professor Stratton.

The object of this course is to teach the fundamental principles of bookkeeping and accounting and their practical applications. Business papers will be used as a basis for the study of all business transactions. Text: Lyons and Carnahan's *Bookkeeping*.

62. **ALGEBRA II.** Class work, seven and a half hours. Four semester credits in the School of Agriculture. Miss McKittrick.

This course takes up ratio and proportion, graphical representation, simultaneous equations, involution, evolution, theory of exponents, radicals, quadratic equations, and applications to practical problems. Text: Hawkes, Luby and Touton's *First Course in Algebra*.

66. **PLANE GEOMETRY I.** Class work, seven and a half hours. Four semester credits in the School of Agriculture. Associate Professor Stratton.

Books I and II of Wentworth and Smith's *Plane and Solid Geometry*

67. PLANE GEOMETRY II. Class work, seven and a half hours. Four semester credits in the School of Agriculture. Miss McKittrick.

Books III, IV, and V of Wentworth and Smith's *Plane and Solid Geometry* are included in this course.

71. SOLID GEOMETRY. Class work, seven and a half hours. Four semester credits. Professor White.

This course comprises the usual theorems and constructions, including the relation of planes and lines in space, the properties and measurements of prisms, cylinders, pyramids, and cones; the sphere and spherical triangle. The solution of many numerical and original exercises is required and mensuration of surfaces and solids is treated. Text: Wentworth and Smith's *Plane and Solid Geometry*.

80. TEACHERS' COURSE IN ARITHMETIC. Class work, four hours. Two semester credits in the School of Agriculture. Associate Professor Stratton.

This course is for rural and grade teachers and those interested in a normal course in arithmetic. The real problems of the class room are taken up and discussed with a view to giving the teachers something definite to be used in their own school work. Modern movements and methods, and also a brief history of arithmetic will be given some consideration. Text: Stratton and Remick's *Agricultural Arithmetic*.

101. PLANE TRIGONOMETRY. Class work, six hours. Three semester credits. Associate Professor Stratton.

Measurement of angles, functions of any angle, functions of multiple and submultiple angles, sum and difference formulæ are included in this course. Triangle and trigonometric equations are solved. Text: Palmer and Leigh's *Plane and Spherical Trigonometry*.

104. COLLEGE ALGEBRA. Class work, six hours. Three semester credits. Miss McKittrick.

Elementary topics, functions and their graphs, quadratic equations are rapidly reviewed. The further treatment includes the subjects of complex numbers, theory of equations, permutations and combinations, partial fractions, logarithms, and determinants. Text: Hawkes' *Higher Algebra*.

110. PLANE ANALYTICAL GEOMETRY. Class work, seven and a half hours. Four semester credits. Professor White.

Coördinate systems and applications; loci; the straight line, circle, parabola, ellipse, and hyperbola are studied in this course. The subject matter is that of the usual first course. Text: *Brief Course in Analytic Geometry*, by Tanner and Allen.

113. CALCULUS I. Class work, ten hours. Five semester credits. Professor White.

The usual topics of differential calculus are considered, together with integration of standard forms, definite integrals, rational fractions, and integration by parts. This course contains problems closely related to work of engineering students. Text, Phillip's *Differential and Integral Calculus*.

116. CALCULUS II. Class work, six hours. Three semester credits. Associate Professor Stratton.

The subject matter of this course belongs in the main to integral calculus. Emphasis is laid upon the applied side. Problems involving areas, lengths, surfaces, and volumes are treated by methods of single integration. The idea of successive and partial integration is applied to areas, moments, centers of gravity, surfaces, volumes, etc. The types of differential equations which the student of engineering is most likely to meet with in his subsequent work are briefly discussed. Text: Phillip's *Differential and Integral Calculus*.

123. TEACHERS' COURSE IN HIGH-SCHOOL MATHEMATICS. Class work, two hours. One semester credit. Professor White.

This course undertakes an examination of the subject matter and methodology of high-school mathematics. It includes a study of high-school needs and of high-school courses in algebra, geometry and trigonometry, with bibliographies and other sources of assistance in teaching high-school mathematics. The course includes also a study of the mathematical situation of the past decade as regards the high-school, with present outlook problems and purposes. The work proceeds by readings, lectures, and reports. The student should have as a basis of his work Young's *The Teaching of Mathematics*.

MODERN LANGUAGES

FRENCH

Assistant Professor LIMPER

151. FRENCH I. Class work, six hours. Three semester credits.

The phonetic symbols being a great help in the acquisition of accurate pronunciation, the first two days are devoted to learning these symbols and a number of useful expressions in French. The recitations are conducted largely in French and considerable time is devoted to conversation. Nevertheless, conversation is considered merely a means to the acquisition of a reading knowledge of French. The fundamentals of grammar are covered in this semester and reading matter in the grammar is supplemented by a reader. Text: Olmsted's *Elementary French Grammar* (first twenty-two lessons) and Allen and Schoell's *French Life* (thirty pages).

152. FRENCH II. Class work, six hours. Three semester credits.

This course is a continuation of French I. The grammar is completed, special attention being given to irregular verbs. Reading and conversation are continued throughout the course. Students who have had one year of French in high school begin with this course. Texts: Olmsted's *Elementary French Grammar* (Lesson XXII to the end) and Allen and Schoell's *French Life*.

161. FRENCH READINGS. Class work, six hours. Three semester credits.

This is essentially a reading course, the purpose being to enlarge the student's vocabulary. Grammar is reviewed and considerable time is devoted to conversation. Fontaine's *En France* and one other short French text are read.

270. TEACHERS' COURSE IN FRENCH. Class work, six hours. Three semester credits.

The subject matter of this course falls under four heads, namely: pronunciation, grammar, reading material, and work outside of the regular curriculum. Under the first heading the physiological basis for the production of the sounds peculiar to the French language are treated. Under the second heading not only are methods of presenting grammar dealt with, but a thorough and systematic review of the subject is included. The third division consists of a careful examination of the various reading texts used in the state. Under the fourth heading methods of conducting a *Cercle franais* and material to be used in it are treated.

SPANISH

Assistant Professor LIMPER

176. SPANISH I. Class work, six hours. Three semester credits.

In this course nouns, adjectives, pronouns, demonstratives, and numerals are treated and the indicative of verbs is studied. The course is largely conducted in Spanish, the student gradually acquiring a fair-sized and practical vocabulary. Text: Hills and Ford's *First Spanish Course* (first thirty-one lessons).

MUSIC*

Professor WESTBROOK
 Instructor SMITH
 Instructor BUGBEY
 Instructor KIMMELL

Instructor LEFFLEE
 Instructor HANNEN
 Instructor CUREY
 Instructor LOVEJOY

101. HARMONY I. Class work, four hours. Two semester credits.

The course in harmony includes the study of scales and intervals, primary and secondary chords and their inversions, harmonizing given bases and melodies, ear training, the chord of the dominant seventh, and keyboard harmony. Students contemplating teaching music in public schools will find this work invaluable to them, as it is the grammar and mathematics of music. At least five must enroll for harmony or the class will not be organized.

110. HISTORY OF MUSIC I. Class work, two hours. One semester credit. Miss Bugbey.

A brief survey of the primitive development of the art is given, together with special attention to the classical and romantic periods and present-day conditions and tendencies. The work is made especially interesting by use of copious illustrations on the phonograph.

120. SCHOOL MUSIC METHODS I. Class work, four hours. Two semester credits. Professor Westbrook.

This course is a general survey of music in public schools from the primary grades through the high school. Methods of presenting music to children in the different stages of development are taught and materials for such work are studied. Suggestions for community music work are also given.

130. VOICE. Private instruction. Professor Westbrook and Mr. Lovejoy.

Hours to suit the convenience of students are arranged for those wishing private vocal instruction. For two half-hour private lessons a week one credit is given.

135. VIOLIN. Private instruction. Miss Hannen.

This work is organized after the same plan as vocal instruction. Credit of one hour is given for private instruction.

140. PIANO. Private instruction. Miss Smith.

This work is organized the same as Voice and Violin and a special piano teacher is in charge.

150. CHORUS. Two hours. Twice a week, one-hour periods. One semester credit. Professor Westbrook.

Every student enrolled in the Summer School is urged to sing in the chorus. This work will be the study and public presentation of beautiful choruses.

151. ORCHESTRA. Two hours. One semester credit.

Every individual who plays an orchestral instrument is urged to bring that instrument and play in the Summer School Orchestra. High-grade orchestra music is studied and is presented in public performances.

* The following fees are charged for private instruction in music:

Two half-hour voice lessons per week throughout the term, with Director Westbrook, \$16.50.

Voice, piano, violin fees, \$14, \$12.50, and \$11 for two lessons per week according to teacher of classes.

The fees are just one-half the regular College semester fees.

PHYSICAL EDUCATION

Professor CLEVINGER
Instructor BOND

COURSES FOR MEN

Courses for men are designed primarily to instruct men who desire expert practical knowledge of the best methods of coaching football, base ball, basket ball, and track and field athletics. These courses should appeal strongly to men who plan to take up coaching as well as men already engaged in coaching in high schools and colleges.

These courses will be conducted by lectures and by practical demonstrations.

Throughout all the courses, lectures and demonstrations will be given on the care and prevention of injuries, how to guard against injuries, how to care for them, and the best methods of bandaging sprains and weak joints.

126. FOOTBALL. Lectures and recitations, four hours. Two semester credits. Professor Clevenger.

This course will cover the following phases: Spirit of the game, discussion of the rules, tackling the dummy, charging sled, defense in general, line defense, secondary defense, kick-off, punting, place kicking, drop kicking, direct pass plays, systems of offense in general, quarterback pass plays, interference, signals, training, and equipment.

130. BASKET BALL. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

The work will cover the discussion of the rules, technique of basket shooting, foul throwing, catching and passing, dribbling, reverse turn, different styles of play, offense, defense, team work, selection of players, training and equipment.

135. BASE BALL. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

The course will cover the discussion of the rules, fielding, batting, bunting, base running, sliding, team work, pitching, catching, proper way to play each position, indoor and outdoor practice methods, coaching, signals, training and equipment.

140. TRACK AND FIELD SPORTS. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

This course will cover the discussion of the rules, starting, sprinting, distance running, hurdling, jumping, vaulting, shot putting, discus throwing, javelin throwing, training, dieting, and equipment.

COURSES FOR WOMEN

175. GYMNASTICS. Lectures and recitations, one and one-half hours; practical work, three hours. One semester credit. Miss Bond.

This course is especially planned for the needs of the teacher in the public schools where no special teacher in this subject is employed. Lectures are given on the general theory of gymnastics and the physiological reason for each exercise. A notebook is required.

Practical Work. The practical work includes free exercises, hand apparatus, heavy apparatus, and practice teaching.

178. FOLK DANCING. Lectures and recitations, one hour; practical work, four hours. One semester credit. Miss Bond.

Lectures are given on the physiological benefit derived from the dances, in costuming, and in the use of the dances in festivals and fetes. A notebook is required.

Practical Work. This course offers graded folk dances of the different nations, suitable for use in schoolrooms, playgrounds, or gymnasiums.

181. GAMES. Lectures and recitations, one hour; practical work, four hours. One semester credit. Miss Bond.

Lectures are given on the problems of grading games, and on the physiological benefits received. A notebook is required.

Practical Work. This course offers practice in games for grammar schools, high schools, playgrounds and gymnasiums.

182. PLAYGROUND MANAGEMENT Lectures and recitations, one hour; practical work, to be arranged. One semester credit. Miss Bond.

This course includes discussions of the organization and administration of playground activities, equipment, and practical experience in conducting playground activities.

184. ESTHETIC DANCING. Practical work, three hours. One-half semester credit. Miss Bond.

Practical Work. This is a class for beginners. Technique and simple esthetic dances are taught. No exercise gives better training in muscle control, poise, and good carriage than does esthetic dancing.

187. TECHNIQUE OF BASKET BALL, BASE BALL, AND HOCKEY. Lectures and recitations, three hours. One semester credit. Miss Bond.

This course is devoted to the technique of these sports, the physiological benefit derived, and the organization of each into interclass contests.

190. SWIMMING W. Five hours. No credit. Miss Bond.

PHYSICS

Associate Professor RABURN
Assistant Professor CONVERSE
Assistant Professor BRACKETT

31. GENERAL SCIENCE. Class work, six hours. Several excursions. One-half unit for admission; no College credit. Assistant Professor Converse.

This course is intended for those teachers who are required to offer courses in general science in public-school work. The course includes class, laboratory and field work. It is based on such everyday problems as: Water supply, air supply, weather predictions, light supply, prime motors, transportation, crops, and similar problems, with a study of what science in general has done and can do to solve them. Text to be selected.

41. INTRODUCTORY PHYSICS. Class work, four hours; laboratory, six hours. No College credit. Assistant Professor Converse.

This course is designed for those teachers who desire some knowledge of elementary physics and yet have not time to take the three regular courses offered in this subject. The entire subject is covered and some time given to working problems. Simple experiments and demonstrations are given. The course is a good review for those who have had high-school physics. Students who expect to take county examinations for certificates to teach are advised to take this course. Text, Black and Davis's *Physics*.

51, 61. ELEMENTARY PHYSICS I (A-I, H-I). Class work, six hours; laboratory, four hours. Four semester credits in the School of Agriculture. Prerequisite: Algebra III. Assistant Professor Brackett.

This course is intended to give a general view of mechanics, sound and heat. Special emphasis is placed upon principles which will be met again

in later work in the same or other sciences. Text, Black and Davis's *Physics*.

52, 62. ELEMENTARY PHYSICS II (A-II, H-II). Class work, six hours; laboratory, four hours. Four semester credits in the School of Agriculture. Prerequisite: Course 51 or 61. Associate Professor Raburn.

This is a continuation of Elementary Physics I and includes a study of light, magnetism and electricity. The fundamental laws are studied and illustrated and the working principles of many electrical appliances in daily use are made the subject of class discussion.

101. HOUSEHOLD PHYSICS. Class work, six hours. Three semester credits. Associate Professor Raburn.

This is a course of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light with its color phenomena and actinic effects; of some of the optical instruments used in scientific work; a study of electric lighting and illumination, and of the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliances and of the operator.

111. AGRICULTURAL PHYSICS. Sophomore year, first semester. Class work, six hours. Three semester credits. Associate Professor Raburn.

This course includes a series of lectures and class demonstrations based upon heat, light and electricity as involved in influencing farm life. The elementary factors of weather and weather forecasting are explained, and access given to the weather records and apparatus of the College weather station. The work in light emphasizes the value of light in plant growth, in spectrum analysis, and in many of the natural phenomena. Electricity is presented in such a manner that the student may gain a working knowledge of the various electrical appliances that can be used on the farm. Text: Spinny's *Physics*.

201, 211. COLLEGE PHYSICS I (GENERAL PHYSICS I, OR ENGINEERING PHYSICS I). Class work, seven and one-half hours; laboratory, six hours. Five semester credits. Assistant Professor Brackett.

This is a course in mechanics, heat, and sound. It or its equivalent is required of general science and engineering students. The course is intended to give the student a thorough working knowledge of the fundamental units and laws involved in force, work, power, and energy, with a discussion of the fundamental laws of gases and liquids, as they occur in the transformation and transmission of force and energy. Textbook, Kimble's *College Physics* or Reed and Guthe's *College Physics*.

Laboratory.—The laboratory work consists in the use of apparatus devised for testing the laws of inertia, moments of force, moments of torsion, and elasticity, together with measurements in thermometry and calorimetry.

202, 212. COLLEGE PHYSICS II (GENERAL PHYSICS II, OR ENGINEERING PHYSICS II). Class work, seven and one-half hours; laboratory, six hours. Five semester credits. Associate Professor Raburn.

This is a course in electricity and light. It or its equivalent is required of general science and engineering students. The work in electricity is of such a nature as to give a working knowledge of the units employed and of the fundamental laws; and to acquaint the student with methods of producing a current, its uses, and the system by which electrical energy is measured. The principal phenomena of light, together with the laws that may have a direct bearing upon light as a standard and method of measurement, are treated in this course. Textbook, Kimble's *College Physics* or Reed and Guthe's *College Physics*.

224. **SPECIAL METHODS IN THE TEACHING OF PHYSICS.** Class work, four hours; laboratory and library, six hours. Three semester credits. Assistant Professor Converse.

The course includes a study of the modern texts, manuals and methods in high-school physics. Students are given an opportunity to help assemble apparatus and to assist in lecture demonstrations, such as lantern, X-ray, manipulation of generator and motor, induction coils, storage cells, spectroscope, nickel-plating, etc. The laboratory includes the usual experiments required in the elementary course in physics. The purpose of the course is to discuss methods best adapted to the presentation of those topics which present special difficulty, to advise methods of illustrating and demonstrating the fundamental principles, and to select from a large number of possible laboratory experiments a list which might be used in any of our high schools of Kansas. This course is intended for those who are either teaching or expecting to teach physics in secondary schools.

PUBLIC SPEAKING

Professor EMERSON

201. **EXTEMPORE SPEECH I.** Class work, four hours. Two semester credits. Professor Emerson.

The work of this course consists in the preparation and delivery of short addresses based on prepared outlines. Careful preparation of material is required. The plan of the speech is made in advance, but the choice of language is left for the moment of speaking. Criticisms and points of theory, given by the instructor, supplement the practice work. Conviction, not entertainment, is the dominant purpose in the course.

204. **DRAMATICS** Class work, four hours. Two semester credits. Professor Emerson.

This is not an elaborate study of the drama, but aims to give instruction in dramatic presentation. Practice work predominates. Special attention is paid to "home talent" or amateur theatricals, and methods of coaching are suggested. The "Little Country Theater" idea is developed.

205. **PUBLIC SPEAKING FOR TEACHERS.** Class work, four hours. Two semester credits. Professor Emerson.

This course is designed, first, to give the teacher training in the art of reading and speaking from the public platform; second, to give the teacher a knowledge of the principles of public speaking as they apply to pedagogy. Practice work predominates. The situation in the grades and high schools is covered. Special emphasis is placed upon the teaching of reading in the schools.

220. **SUMMER SCHOOL PLAY.** Professor Emerson.

The department prepares and presents during the session one amateur play. The Summer School plays are of a standard type, good royalties being paid to secure them. Any student enrolled in the Summer School is eligible to try out for the cast.

ZOOLOGY

Associate Professor HARMAN
Instructor BROWN

105. **GENERAL ZOOLOGY.** Class work, six hours; laboratory and field work, twelve hours. Five semester credits. Required in the curricula in agriculture and home economics; with an extra credit hour will satisfy the requirement in general science. Miss Brown.

The structures and functions of types of both invertebrates and vertebrates, and animal relations, are studied in the class and on field trips.

Laboratory.—Studies are made of the form and function of types of living animals, and dissections and reconstructions made of the important systems of selected types. A considerable part of the laboratory time is spent in the field identifying and studying animals in their natural relations.

108. EMBRYOLOGY AND PHYSIOLOGY. Class work, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: General Zoölogy or its equivalent. Associate Professor Harman.

The first three-fifths of the term is devoted to (a) embryology and the remaining two-fifths to (b) human physiology. The course thus falls into two closely related parts: (a) a study of the development of the germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth with special reference to the human; and (b) a study of the functions of the organs and systems of the human body, with special consideration of the digestive, respiratory, circulatory, nervous, and urino-genital systems and organs of special sense.

Laboratory.—The laboratory work includes: (a) Studies of the male and female germ cells, stages in the process of fertilization, the segmenting ovum, and whole mounts and serial sections of the chick and pig embryos in several stages of development, with demonstrations of types of mammalian foetal relations, and (b) experiments for the demonstration of the composition and functions of bone, blood, lymph, and the reaction of muscles, nerves, parts of the digestive, respiratory, excretory, and other systems.

Division of College Extension

HARRY UMBERGER, *Dean*

The people of Kansas believe in using their educational institutions to their full capacity, not only for the students privileged to come to them, but also for the State at large. They know that the number who complete a College course in agriculture, engineering, or home economics is small in comparison with the great majority of the people who cannot go to college, and it is their wish that this majority also may be served. With this desire the Agricultural College is in full sympathy, and it is its ambition not only to give its resident students the best possible training for leadership in life's work but to be of direct service to every community of the State.

As far back as 1864 conventions of the farmers of Manhattan and vicinity were held at the College. The first well-organized farmers' institute conducted under the auspices of the Faculty was held at Manhattan, November 14, 1868, and this was followed by a similar gathering at Wabaunsee, November 21 and 22 of the same year. In 1868 the Board of Regents adopted a resolution recommending "that a system of lecturing on agricultural subjects at this College and the populous settlements of the several counties of the State should be conducted so that the benefits of farming according to correct agricultural principles may be disseminated throughout the State."

A few meetings were held each year for the next several years, increasing in number from 1879, but no definite appropriation for extension work was made until 1899, when \$2,000 per year was appropriated for this purpose by the State legislature. The annual appropriation remained at this figure until 1905, when the legislature appropriated \$4,000 for the work, to which the College added \$800. Up to this time a regular staff for extension work was employed, and all extension activities were conducted by a committee. In October of that year, however, a superintendent to organize the institute work was selected by the Board of Regents, and in July, 1906, the Department of Farmers Institutes was formally organized.

The interest in extension work throughout the State now developed rapidly. In 1907 the legislature appropriated \$10,500 for the two years, to which the College added \$1,000. In 1909 the belief in the value of agricultural extension was so great that \$52,500 was appropriated by the legislature for the biennium, and this amount has been increased by each succeeding legislature, \$35,000 being appropriated for 1912, \$40,000 for the year 1913, \$45,000 for 1914, and \$50,000 for the year ending June 30, 1915.

This rapid development of extension work was made possible not only because the people of the State wished to have such work done, but because much new light has been thrown on the essentials in agriculture by

the effective experimental work done by the Experiment Stations and by the United States Department of Agriculture.

In 1914 the Federal government felt that the useful and practical information on subjects connected with agriculture and home economics developed by the experiment stations, by the Department of Agriculture, and by the experience of the best farmers and farm homes should be made more readily available to everyone; and in order that it might be more fully and effectively diffused among the people of the several states and its practical application encouraged, the Congress of the United States, in 1914, passed the Smith-Lever bill, which provides for "coöperative agricultural extension work between the agricultural colleges in the several states receiving the benefits of an act of Congress approved July 2, 1862, and of acts supplementary thereto, and the United States Department of Agriculture." To further this act the Congress provided for an annual appropriation of \$480,000, of which \$10,000 is paid each year to each state which assents to the provisions of the act. This initial appropriation is increased each year for seven years, such increase being allotted annually to each state in the proportion which the rural population of such state bears to the total rural population of all the states, providing an equal sum has been appropriated for that year by the legislature of such state, or has otherwise been provided from within the state, for the maintenance of the coöperative agricultural extension work.

Under this act the coöperation of the agricultural colleges and the United States Department of Agriculture has been assured, extension work has become a national as well as state project, and its effectiveness has been greatly increased.

The governor of the State and the Kansas legislature of 1914 accepted the provision of the Smith-Lever act immediately, and \$10,000, therefore, was secured from the Federal government for extension work for the year ending July 30, 1915. The additional sums coming from the Federal funds under this act to the State for the year ending June 30, 1916, and 1917, respectively, were \$14,555.45 and \$26,685, for the years 1918 and 1919, \$38,816 and \$50,946, respectively; and for the years 1920 and 1921, \$63,073.65 and \$75,203.20, respectively. These sums were offset by an equal appropriation by the legislature of Kansas, and in addition, from the appropriation made to the Agricultural College for all its work, \$34,000 was set aside for extension work for the year ending June 30, 1920. During the war Congress made an emergency appropriation to extension work, in order that special attention might be given to maximum production of food, conservation and economic utilization of farm products. This appropriation terminated June 30, 1919. There was such great demand for continuation of much of the work started under this appropriation with a view to carrying it on on a more constructive and permanent basis, that Congress appropriated funds for this purpose, effective July 1, 1919. This is known as the supplementary Federal Smith-Lever appropriation. The total sum for extension work under the Smith-Lever act and from State funds for the year ending June 30, 1920, therefore, is as follows: From the Federal government, through the Smith-Lever act, \$73,073.65; from the Federal government through the supplementary Smith-Lever appropriation, \$36,388.65; from the State through the Agri-

cultural College, \$34,000; from the State direct, appropriation to offset the Smith-Lever appropriation, \$63,073.65; from county appropriations as offset to the supplementary Federal Smith-Lever appropriation, \$36,388.65; total, \$242,924.60.

Another act of the legislature, of very great importance to the extension activities of the Agricultural College and to the State, went into effect July 1, 1916. This is known as the county farm-bureau law, or "An act providing for State and county appropriations for the support of county farm bureaus." It provides "that whenever there shall be organized in any county in the State of Kansas a county farm bureau having a membership of 25 per cent of the *bona fide* farmers of the county, or as many as 250 farmers, and having for its purpose the giving of instructions in agriculture and home economics to the people of said county through practical demonstrations and otherwise, and the employment of a county agricultural agent or agents to prosecute this work, the Kansas State Agricultural College shall contribute, from Federal and State funds granted for demonstrations in agriculture and home economics, not less than \$800 nor more than \$1,600 per annum, as far as such funds are available, towards the salary of such county agricultural agent; . . . provided, that before such appropriation is made the county farm bureau shall present to the county commissioners of its county a copy of the constitution and by-laws adopted by the farm bureau and approved by the Kansas State Agricultural College, and a certified statement of deposit in a local bank of the county of not less than \$800, which shall be used, subject to the order of the county farm bureau, for providing the necessary equipment for said bureau." It is provided further that when these conditions have been fulfilled the "board of county commissioners shall appropriate from the public funds of the county a sum of money not less than \$800 per annum, and not to exceed \$1,600 per annum, to assist in the payment of the salary of the county agricultural agent and the expenses of the farm bureau."

The legislature of 1919 amended this law to read "the Kansas State Agricultural College shall contribute, from Federal and State funds granted for demonstrations in agriculture and home economics, not less than \$1,200, as far as such funds are available, towards the salary of such county agricultural agent, or agents"; and further, "that the said board of county commissioners shall appropriate a sum of money not less than \$1,200 per annum to assist in the payment of the salary of the county agricultural agent and the expenses of the farm bureau. The executive committee of the farm bureau shall be required to prepare and present to the board of county commissioners, on or before the first Monday in August, a budget or budgets showing clearly the amounts needed from year to year, which budgets shall be used as the basis for the appropriation by the county commissioners, and the county commissioners shall be empowered to make a tax levy against the property of the county, real and personal, sufficient to raise the funds needed for the farm-bureau work, which levy shall be in addition to all other levies authorized by law. Before and until the income from such tax levy is available, the county commissioners may make appropriations necessary for farm-

bureau work from the general funds of the county, and shall have power to replace such appropriations from the general fund by transferring an equal amount from the farm-bureau fund when available."

The administration of this law was placed in the hands of the Kansas State Agricultural College by a general clause providing that the work of the agricultural agent shall be "under the general direction and supervision of the Kansas State Agricultural College," and "the constitution and by-laws of each bureau and all accounts and expenditures of funds provided for by this act shall be subject to the approval of the director of extension of the Kansas State Agricultural College."

Since the original act became effective, July 1, 1915, seven of the original ten county farm bureaus have availed themselves of its provisions. Forty additional counties have organized farm bureaus that are at work, and others are organizing.

The rapid growth of extension work has demanded efficient administrative machinery. In the judgment of the President of the College and the Board of Regents it became necessary to create, in December, 1912, a Division of College Extension coördinate with the other divisions of the College. This at first was subdivided into four distinct sections or departments, but the increase in work and personnel of the division has made necessary a reorganization into eight departments, namely: institutes and extension schools, county-agent work, boys' and girls' club work, home economics, emergency home demonstration-agent work, drainage and irrigation engineering, rural service, and home-study service, each with its own head and staff. The heads of the departments are responsible to the director, who is Dean of the Division of College Extension. Through this organization it is possible to administer the extension work effectively and economically, to reach directly more than 500,000 people in the State each year, and to conduct some activity in every county.

Publications covering practical subjects in the field of agriculture, home economics and rural engineering are issued from time to time by the Division of College Extension as bulletins, circulars and leaflets. The authors of these publications are the extension specialists or the specialists of the departments in the other divisions of the College. The regular publications of the Experiment Station also are used extensively in the extension work. A series of publications in coöperation with the United States Department of Agriculture is receiving special attention. Extension publications are mailed regularly to a list, composed of members of farm and home institutes, home-makers' clubs, extension schools, and farm bureaus; *i. e.*, to members of organizations coöperating closely with the Agricultural College. Any citizen of the State, however, on request, may secure copies of individual publications.

While the extension work is directed by the Division of College Extension for administrative efficiency, its scope would be limited were it not for the close coöperation of the other divisions and departments of the College, which help not only in supplying lecturers for agricultural meetings and extension schools, material for publication, assistance in demonstration work and helpful counsel, but also are responsible for all subject matter taught by the extension specialists.

Institutes and Extension Schools

T. J. TALBERT, Superintendent
 MABLE CALDWELL, Assistant to the Superintendent
 H. J. BOWER, Soils
 RALPH KENNEY, Crops
 E. G. KELLY, Entomology
 R. W. KISER, Animal Husbandry
 C. G. ELLING,* Sheep Production
 W. E. PETERSON,* Dairy Husbandry
 H. E. DODGE, Dairy Husbandry
 HAROLD SIMONDS, Horticulture (resigned, Jan. 1, 1920)
 T. A. CASE, Veterinary Medicine

The Department of Institutes and Extension Schools has direct supervision over approximately three hundred and fifty farm and home institute organizations, all two-day and three-day extension schools in agriculture and home economics, and the work of the extension specialists.

Each farm and home institute of the State is an association or farmers' club, with regular officers, constitution and by-laws, and is required by law to meet at least annually. While some organizations hold six or more monthly meetings, practically all of them have no fewer than three monthly meetings, because no institute organization can obtain State aid unless it has at least three meetings in addition to the annual meeting at which some representative of the College is present. The College plans to send two specialists, one in agriculture and one in home economics, to present at the annual meeting certain well-defined lessons. The specialists and their subjects are chosen because of a known need or interest in a particular community or a plan to start or encourage certain definite lines of work.

The programs for all annual meetings are based on suggestive outlines sent out by this department. These are completed and returned by the local officers. The department furnishes literature, on request, for members who are to take part in the program of an institute, grange, farmers' union or other organization.

The monthly meetings which are held by many of the local organizations in this State are an important feature of the institute work. These meetings are usually held on the second Saturday afternoon of each month from September to May. The Department of Institutes and Extension Schools suggests the subject for discussion, and the same subject may be discussed in every institute in the State. In this way certain important, timely subjects are being discussed by thousands of farmers and their wives at seasonable times, thus promoting a general uniformity of action.

Each year some special topics, such as farm management, the management of live stock, gardening, some phase of dairying, etc., are made especially important in institute programs, either for the whole State or for certain specified districts. During 1918 the monthly meetings were largely concerned with the consideration of topics of value to farmers and their wives interested in increased production and in establishing their agricultural program upon a peace-time basis.

Every institute has a membership paying a membership fee. The membership lists constitute the mailing list for the publications issued

* The U. S. Department of Agriculture coöperates in furnishing directly all or a part of the salaries and the franking privilege.

by this department. In addition to receiving these pamphlets each member who fills out and returns a membership blank receives from the College, from the government or from some State experiment station such other obtainable literature as his interests demand.

EXTENSION SCHOOLS

The demand among men and women for instruction in the essentials of agriculture and home economics is steadily increasing. Owing to the nature of the farm and home institutes they are able to meet this demand only in part, and for that reason extension schools or short courses in agriculture and home economics have been organized in communities which desire more complete courses in these subjects than can be given at the institutes.

The College now conducts extension schools in agriculture and home economics of three days' duration sending to each school three or four instructors. Here well-planned, comprehensive courses are given in the various lines of agriculture and home economics, so that some of the essentials of these subjects may be learned. The local committees are required to organize the classes and pay the local expenses for each school. The Agricultural College supplies the teachers and pays their railroad fares from funds appropriated to it for this purpose.

In addition to these general schools, special schools in breeding, animal diseases, dairying, poultry, orcharding, road making, and cement construction are held in communities desiring them and willing to defray the local expenses. Five-day schools in home economics may be had on request.

Extension schools are popular where the communities are brought to understand the work given. Almost every community which has had one school has petitioned for another. Increased interest is being manifested in the extension schools, and it is believed that more requests will be received in 1920 for schools than the College will be able to schedule with its present force of extension workers.

EXTENSION SPECIALISTS

The specialists of this department work in extension schools and institutes during the winter months only. During the spring, summer and fall they conduct special campaigns, such as silo building, wheat improvement, grasshopper control, cow testing, hog-cholera control, and other campaigns, and coöperative demonstration work. The latter phase of the work of the extension specialists is being especially met by the organization of coöperative demonstration work in each branch of agriculture in a certain number of counties each year. In much of the coöperative work each specialist has from two to six coöperators in each county. These men and women work under the direction of the specialists and the supervision of the county agents, keep records of the work, and call demonstration meetings at their farms on each trip of the specialist. The number of visits which each specialist makes to each point varies from two in the case of the specialist in soils to six in the case of the specialists in horticulture and entomology. The aim in all of this coöperative demonstration work is to show as well as to explain.

This line of work is especially appreciated, and the representatives of the department have been able to meet only a fraction of the demands upon them.

Educational work in hog cholera is conducted in counties where the Agricultural College is requested to put it on. One veterinarian devotes all of his time to this work, holding educational meetings in every community, until every farmer has had opportunity to attend a meeting near his home.

The calls for the extension specialists in all lines of work are so many that it is impossible to meet more than two-thirds of the calls for assistance from county agricultural agents and from farmers' organizations. While the number of specialists is being increased rapidly, yet the work is growing far more rapidly, thus indicating a healthy condition.

Agricultural Agent Work*

H. UMBERGER, Dean of Division of Extension and County Agent Leader
 KARL KNAUS, Assistant County Agent Leader (in charge, Jan. 1, 1920)
 A. F. TURNER, Assistant County Agent Leader
 F. A. DAWLEY, Assistant County Agent Leader (temporary appointment)
 E. L. RHOADES, Farm Management Demonstrator

DISTRICT AGRICULTURAL AGENT

L. E. WILLOUGHBY, Hays

COUNTY AGRICULTURAL AGENTS

F. S. TURNER, Anderson County
 H. F. TAGGE, Atchison County
 THEO. W. THORDARSON, Barton County
 HOMER B. WILLIS, Barber County
 A. C. MALONEY, Bourbon County
 J. A. HENDRIKS, Chase County
 A. I. GILKISON, Cheyenne County
 ROBT. E. CURTIS, Clay County
 A. B. KIMBALL, Clark County
 CHAS. J. BOYLE, Cloud County
 J. H. McADAMS, Coffey County
 E. L. GARRETT, Comanche County
 F. H. DILLENBACK, Doniphan County
 R. O. SMITH, Douglas County
 F. JOE ROBBINS, Franklin County
 CHAS. E. CASSEL, Finney County
 H. J. ADAMS, Gray County
 W. W. WRIGHT, Greenwood County
 E. H. LEEKER, Jackson County
 HARRY S. WILSON, Johnson County
 JOE M. GOODWIN, Jefferson County

T. R. PHARR, Jewell County
 H. L. HILDWEIN, Kingman County
 GEO. W. SALISBURY, Labette County
 I. N. CHAPMAN, Leavenworth County
 GAYLORD HANCOCK, Lyon County
 R. F. OLINGER, Marion County
 O. T. BONNETT, Marshall County
 C. V. MALONEY, Meade County
 HAYES M. COE, Montgomery County
 W. L. TAYLOR, Morris County
 V. M. EMMERT, McPherson County
 E. L. McINTOSH, Nemaha County
 C. D. THOMPSON, Neosho County
 R. P. SCHNACKE, Pawnee County
 E. I. MARIS, Rawlins County
 E. J. MACY, Sedgewick County
 FRANK O. BLECHA, Shawnee County
 W. A. BOYS, Sumner County
 R. W. SHAFER, Washington County
 A. D. FOLKER, Wyandotte County
 F. A. BILLHIMER, Wichita-Greeley Counties

Agricultural agent work in this State is provided for by the Federal Smith-Lever Act and the State farm-bureau law. The Federal Smith-Lever Act provides an appropriation which increases each year until 1922, which is distributed among the states according to their agricultural population. In addition to this it is supported from July 1, 1919, to July 1, 1920, by supplementary Federal agricultural appropriation, this being made necessary by the fact that this work increased more rapidly during the war period than could be financed by regular Smith-Lever funds. Before the Federal funds are available they must be duplicated within the State.

* The U. S. Department of Agriculture coöperates in furnishing all or a part of the salary of every member of this department. In the case of the county agricultural agents, counties, through farm bureaus, furnish a part of the salary and all expenses.

The State legislature appropriates at each session an amount equal to that available to this State from the Federal Smith-Lever appropriation. In addition to this, the State farm-bureau law, effective June 17, 1919, provides that when one-fourth, or as many as two hundred and fifty of the *bona fide* farmers of a county, shall form a farm-bureau organization, adopt a constitution and by-laws and elect officers, and when an equipment fund of at least \$800 has been provided and deposited in a local bank, the county commissioners shall appropriate at least \$1,200 per year (which sum may be raised by a special tax levy), and the Agricultural College shall appropriate at least \$1,200 from the State or Federal funds above mentioned for the purpose of hiring a county agricultural agent and paying his expenses.

Previous to 1914, county agents were financed by membership dues and private subscriptions. At that time a membership of at least one hundred, paying dues of \$5 each, was required. In 1914 Congress passed the Smith-Lever Act, and in 1915 the Kansas legislature passed a farm-bureau law, which has since been the basis for the extension of the county-agent work. January 1, 1916, there were ten counties with organized farm bureaus. This number has increased gradually, until at the present time we have fifty-seven organized farm bureaus in the State.

COUNTY AGENTS. At the present time, January 1, 1920, the following forty-seven counties have farm bureaus with county agents actively at work or the position temporarily vacant: Anderson, Atchison, Barton, Barber, Bourbon, Chase, Cherokee, Cheyenne, Clay, Clark, Coffey, Comanche, Doniphan, Douglas, Franklin, Finney, Ford, Gray, Greenwood, Harvey, Hodgeman, Jackson, Johnson, Jefferson, Jewell, Kingman, Labette, Leavenworth, Lyon, Marion, Marshall, Meade, Miami, Montgomery, Morris, McPherson, Nemaha, Neosho, Pawnee, Pratt, Rawlins, Sedgwick, Shawnee, Sumner, Washington, Wilson, and Wyandotte. The Wichita-Wilson Farm Bureau also has a county agent, as the farm-bureau law provides that west of the line which forms the boundary of Phillips and Norton counties two counties may unite in forming a farm bureau.

The following nine counties will hire county agricultural agents previous to July 1, 1920: Allen, Cloud, Crawford, Osage, Pottawatomie, Rooks, Rush, Woodson, and Ness.

DISTRICT AGENTS. A district agent is maintained at Hays, who coöperates with the Fort Hays Experiment Station in extension work in the adjoining counties.

The agricultural agents are active in conducting demonstrations in the best methods of production, in assisting farmers with suggestions and plans relative to farm management and the farm business, and in organizing rural activities. The field demonstrations are conducted for the purpose of introducing new crops, and of testing relative values of varieties already grown, and methods of cultivation and harvesting. Demonstrations in proper methods of feeding, and care and management of live stock are conducted. Methods of controlling insects and diseases of farm crops, orchards and gardens, and diseases of live stock are

demonstrated. Surveys of the farm business are made, in order to study the conditions prevailing in typical areas and possible improvements in farm-management methods that should be employed. Improved methods of marketing and community welfare, in which better social relations are fostered, also are important features of this work. The agent interests himself in practically every farm activity, especially where there is need of improvement.

FARM MANAGEMENT DEMONSTRATIONS. Farm-management demonstrations are conducted by a farm-management specialist in coöperation with the agricultural agents. In these demonstrations such records are taken as are essential to the determination of the net profits of the individual farms. These records are classified according to different types of farming, the profits of each type are determined, and individual farm records are compared with the average of all the farm records taken. The results of the study are made known to each farmer interested, in order that he may use the suggestions received in any need or reorganization of his own business. For those who desire it, farm account books are opened and instruction is briefly given in keeping simple records. This work was begun in September, 1914. The demand for this work was greatly increased by the enactment of the income-tax law and the resulting need of business records by which the income might be determined, and by the demand for accurate cost-of-production figures by price-fixing commissions.

Home Economics

MRS. MARY WHITING MCFARLANE, Director
MISS RENA FAUBION, Specialist in Dairying
MISS MINNIE SEQUIST, Specialist in Clothing and Textiles
MISS GERTRUDE LYNN, Specialist in Dietetics
MISS W. PEARL MARTIN, Specialist in Home Nursing
MRS. HARRIET W. ALLARD, Specialist in Household Management and Assistant in Institutes
MISS SUSANNA SCHNEMAYER, Specialist in School Lunches and Assistant in Institutes

Instruction in home economics is secured by about 800 women annually at the Agricultural College, and there are many thousand others throughout the State who have had the advantages of resident instruction either in this or some other institution. Large as this number may seem, it is small when compared to the great number of women and girls of the State to whom these courses are not available. To give as much assistance as possible to this vast majority of women is the aim of the Department of Home Economics in Extension, and with this in view, seven women are regularly employed, and two others have been employed part time as special assistants during the year. The extension work in home economics is conducted through farm and home institutes, extension schools, special women's meetings, county normal institutes, home-makers' clubs, by judging at fairs, through lectures at chautauquas, and by means of personal correspondence. During the institute season, from October to March, four women spend full time in giving lectures and demonstrations before farm and home institutes and home-makers' clubs conducted in connection with them. From March to September, inclusive, the same

specialists assist in women's meetings, in county normal institutes, and in judging at fairs, at chautauquas, and in special extension schools. From May to September, inclusive, two women give their time to community assembly work. For the entire year the remaining four women spend their time in extension schools, and special demonstration meetings.

EXTENSION SCHOOLS IN HOME ECONOMICS

The extension schools in home economics, covering a period of a week in each place and giving definite courses of instruction, enable the women of the State to avail themselves of the opportunities offered by the Agricultural College at their very doors. The sessions of the school are conducted both forenoons and afternoons, each half day being divided into a lecture period of one hour and a demonstration period of one and one-half hours. For any one school two courses from the following list may be selected: Food preparation, home management, home nursing, sewing, canning, dietetics, and home art. The minimum required membership for a school of this kind is twenty, but as many more may become members as the room in which the school is to be held can accommodate. A tuition fee, usually of \$1 per member, is collected by the local committee, to be used in defraying the local expenses. Schools in home economics alone are held from March until October, and in connection with extension schools in agriculture, from November until March. During the year 1919 one hundred twenty-three schools were held, with an average attendance of fifty-six.

Special schools in dressmaking are held on request. These are two weeks in length, lasting from Monday afternoon until the second Friday evening. The dressmaking schools are designed primarily to give general instruction in sewing and special suggestions to members desiring to make their own dresses.

The prevalence of influenza necessitated the holding of special schools in home nursing, which proved one of the most popular forms of extension work.

Home Demonstration Work

MISS FRANCES L. BROWN, State Home Demonstration Agent Leader
MISS ELSIE BAIRD, Demonstration Agent, Anderson County
MISS ELLEN BATCHELOR, Demonstration Agent, Atchison County
MISS SARA JANE PATTON, Demonstration Agent, Cherokee County
MISS ETHEL McDONALD, Demonstration Agent, Meade County
MISS MAUDE COE, Demonstration Agent, McPherson County
MISS IRENE TAYLOR, Demonstration Agent, Shawnee County
MISS MOLLIE LINDSEY, Demonstration Agent, Washington County

Home demonstration work was made possible in August, 1917, through the passage of the emergency extension bill by Congress. This bill provided funds for the employment of county and city home demonstration agents. It carried an appropriation providing for the salaries of these agents, but it stipulated that the expenses and office room and equipment should be provided by the county or city in which the home demonstration agent was placed. These expenses were met in this State in each case by a fund of \$400 guaranteed by the city or county at the time the

services of a home demonstration agent were requested. These agents were called emergency home demonstration agents.

In taking up the work in cities it was considered a public utility, and the expense fund and equipment were provided either by the city commission, the chamber of commerce, or the public schools, separately or together. Representatives of these organizations, and other leading organizations in the city, were selected to act as an advisory committee. This committee acted in conjunction with the Division of Extension of the Agricultural College in supervising the work of the agent. Wherever it was possible for the agent to use an organization already existing, this was done, but where this was not possible, the agent, with the aid of her advisory committee, built an organization.

In the counties the work of the home demonstration agent has been started in two different ways. In the beginning several agents were asked for and placed in counties having no farm bureaus but other organizations, such as the council of defense, willing to guarantee the \$400 for expenses and office equipment. The work was taken up by the council of defense in Ness, Cowley, Stevens, and Seward counties. Cowley county discontinued the work July 1, 1918; Stevens, March 1, 1919; Ness, May 10, 1919; and Seward, July 1, 1919.

In farm-bureau counties, in addition to the conditions already mentioned, it also was necessary to organize the county for the work of the woman agent. A woman was selected in each township as a vice president, and these vice presidents formed a farm-bureau auxiliary with the usual officers. This organization was completed before the home demonstration agent began her work in the county. However, after following this plan for a time, it was found that it would be advantageous to defer the organization until the agent had reached the county, and this change was made.

Since the State conference of home demonstration agents, which was held in August, 1918, such farm-bureau counties requesting women agents as have been able to reorganize, have reorganized on the basis of an ideal farm bureau. That is, the women are taken into the farm bureau as members, having all the rights and privileges accorded to any member, and they become a part of the working organization. In such counties the work of the home demonstration agent is taken up as a part of the regular farm-bureau program.

January 1, 1918, three home demonstration agents had been placed in cities, and twelve county home demonstration agents were at work.

During the spring and summer months of 1918 the program for the work of the home demonstration agents was furnished largely by the Federal Food Administration, and the greater part of the agent's time was used in giving public talks and demonstrations concerning the use of various substitutes. Since the signing of the armistice the use of substitutes has become less imperative, and the home demonstration agents have directed their efforts toward bringing their work to a permanent and constructive basis. To this end the women of the counties and cities having these agents have gathered in groups to discuss the needs of their localities, and the agents, with the help of the women of the counties or

cities, have been building up a program of work intended to fill these needs. The home demonstration agent develops the projects included in the program, by means of talks and demonstrations in schools and clubs, exhibits at fairs, and by personal visits. In cities and counties where home demonstration agents have been located for a year the results are encouraging.

The following cities in the State have had home demonstration agents: Kansas City, Independence, Fort Scott, Wichita, Pittsburg, and Hutchinson. County home demonstration agents were at work in Anderson, Atchison, Chase, Cherokee, Lyon, Marshall, McPherson, Morris, Nemaha, Ness, Seward, Shawnee, Stevens, Washington, and Wyandotte counties. The Riley county agent acted also as agent for the city of Manhattan.

On June 30, 1919, the emergency fund, under which all this work had been carried on, was discontinued, and beginning with July 1 the work ceased to be known as emergency home demonstration work, and became home demonstration work, being placed upon an entirely different basis. Thenceforth those counties enjoying the services of a home demonstration agent must pay dollar for dollar for the use of government funds expended in the county for this purpose, because the appropriation set aside for this work was much less than that set aside from the emergency funds.

There were funds enough to continue the work in eight counties only; accordingly the opportunity was given to those counties that had had a home demonstration agent working in connection with a regularly organized farm bureau. In every instance where such an opportunity was given the farm bureau met the necessary conditions and petitioned for the work. The following counties were thus able to continue the work with the home demonstration agent: Anderson, Atchison, Morris, Lyon, McPherson, Meade, Cherokee, Shawnee, Washington. Nemaha county also continued the work, paying the entire expense of the home demonstration agent, since there were not enough Federal funds to go around. Because of lack of local funds, Lyon county suspended the work August 7, and Nemaha county, September 15.

Since July 1, 1919, a farm bureau desiring the services of a home demonstration agent must meet the following conditions:

1. Supply an office properly equipped for the work.
2. Provide adequate stenographic help.
3. Must set aside a fund, part of which shall be used to defray the salary of the home demonstration agent, and \$500 of which is to be used as an expense fund. From this expense fund the home demonstration agent is reimbursed for the official use of her car, and equipment and supplies are provided.

The work in the counties established since July 1 is on a permanent basis and bids fair to meet with the same measure of success as has been accorded the county agent work.

Boys' and Girls' Club Work*

OTIS E. HALL, State Club Leader**

LOTTIE MILAM, Assistant

L. O. WILLIAMS, Assistant

P. R. IMEL, Assistant†

J. L. PREHN, Assistant†

Boys' and girls' club work has become one of the very important phases of Agricultural College extension service. The club work is divided into club projects, and each project represents some specific farm or home activity, such as corn growing, pig feeding, gardening, canning, sewing, bread baking, etc.

Most of the clubs are conducted in coöperation with farm bureaus, farm and home institute organizations, county boards of education, and business men's organizations. Almost any community, however, can have a club by interesting five or more boys and girls in one of the club projects and by getting pledges from them to carry on the work as outlined by county and State leaders. Through these clubs the College is able to reach and serve a class of young people which it could neither reach nor serve in any other way. A large number of boys and girls get their first acquaintance with the College through the club work. Very few club groups fail to have a representative direct from the College visit them some time during the year. County agents give frequent and valuable help to these young workers. From College specialists, from county agents, and through special letters and lessons sent out from the State leader's office, the boys and girls learn definitely regarding the results of many of the more important experiments conducted by the Experiment Station, and regarding farm practices recommended by the College. In fact, some of the most valuable methods and practices which the College has to offer are put into actual practice by these young people.

Complete records showing expenses and receipts are kept by the boys and girls, and they meet now and then with their local and county leaders to consider various matters pertaining to their different projects. The president of the club in most cases is one of the club's own members. In this way valuable experience in leadership is had by hundreds of boys and girls who have no other source for such experience. At the close of the club season the different club members send in their records and stories, and many of them exhibit at local, county and State contests. In short, the club boys and girls shoulder responsibilities, meet with failure as well as with success, and do on a small scale what they will be obliged to do on a larger scale when, in later years, they become real farmers and home-makers.

* The U. S. Department of Agriculture coöperates in furnishing a part of the salary of each one in this department.

** Resigned, March 31, 1920.

† Resigned, January 1, 1920.

Drainage, Irrigation and Farm Engineering

H. B. WALKER, Drainage and Irrigation Engineer
IRA E. TAYLOR, Assistant Engineer (resigned, January 1, 1920)
_____, Farm Engineer

Reclamation by drainage and irrigation is an important factor in the development of the agricultural resources of Kansas. Eastern Kansas has its problems of flood control and land drainage, while in Western Kansas irrigation by pumping is each year more extensively practiced with uniform success. The Agricultural College maintains a Drainage and Irrigation Department to assist in the development of reclamation work. Competent engineers are employed to give practical help to persons or communities interested in field irrigation or land drainage. It is the duty of the department to render assistance in the organization and management of drainage districts; to give advice to farmers contemplating farm-drainage projects; to advise with individuals or communities interested in irrigation development; to prepare and approve plans, estimates and specifications, for drainage and irrigation projects; and to carry on a general campaign of education for the best methods of land reclamation.

The improvement of the farmstead involves many technical questions of an engineering nature. The modern farm is equipped with a water-supply system, a lighting plant, a sewerage system, up-to-date farm buildings, farm motors, and a farm workshop. The installation of this modern equipment is often simplified if proper technical advice is available. The Drainage and Irrigation Department has been enlarged to include farm engineering. It is the duty of the farm engineer to render engineering assistance to farmers in all matters relating to the development and modernization of the farmstead; to furnish plans and specifications for farm improvements; and to carry on a campaign of education for the best methods of farm engineering.

The services of the engineers of this department are free, except for the usual charge for traveling and local expenses.

Rural Service

WALTER BURR, Director

The work of the Rural Service Department is now on the project basis, approved by the States Relations Service of the United States Department of Agriculture, under the title "Rural Organization."

The object of this department is to advise with and assist county agents and farm bureaus in coördinating the activities of groups of farmers, community leaders and farmers' organizations for more effective work in the development of the agriculture and home economics of the rural community.

Conferences of leaders are held in local communities for discussion and consultation in regard to the work undertaken by organized groups, and to ways in which the efforts of these groups may be coördinated. Sug-

gestions are given by letter and personal visit to individuals and groups contemplating organization, as to what type of organization is best suited to local needs. Where communities lack unity, because of a multitude of unrelated and overlapping organizations, efforts are made through personal visits and correspondence to interest the organizations in coordinating their activities through the farm bureau.

Programs for all-round community development in harmony with county farm-bureau plans are worked out on the request of community leaders in coöperation with other specialists on the extension staff. One State-wide rural organization conference is conducted each year. At this conference methods of rural organization and community programs are given consideration.

Home-Study Service

(Correspondence)

V. L. STRICKLAND, Director
GEORGE GEMMELL, Agronomy
F. G. WELCH, Animal Husbandry
HELEN W. FORD, Home Economics
FLOYD PATTISON, Industrial Subjects
JULIA B. ALDER, English and History
P. P. BRAINARD, Education

NOTE.—The Faculty members employed in the Home-study Service devote their entire time to the work of teaching by correspondence. They keep in close touch with the various departments of the College, and all credit courses which are offered by correspondence must first meet the requirements of the regular College department handling the courses in residence.

There are many people in Kansas who, for many reasons, cannot attend classes on the campus, although they have interest in and need for the work offered by the Kansas State Agricultural College. Moreover, it has quite generally come to be recognized that even the completion of a college course does not end the necessity for education. It is in recognition of these manifold demands, far greater in number than the resident attendance at the College, that the institution offers to citizens of the State an opportunity to study at home various lines of agriculture, home economics, mechanic arts, farm engineering, and numerous high-school subjects.

The Home-study Service attempts to meet the widely varying needs and conditions of the people of Kansas by offering the following types of service:

1. *Free Reading or Unit Courses*, each of which is a one-lesson treatment in a simple, brief, and nontechnical way, of a single problem or unit of subject matter for which there is a demand in some phase of practical everyday life. The courses in this list are so numerous and varied that few interests are not touched by them. That they may be readily available and freely used by all to whom they would be helpful, they are made free to residents of the State. For full information concerning Free Reading Courses, send for Part I of the Home-study Service Announcement.

2. *Extension or Vocational Courses*, which are complete, comprehensive courses adapted to the needs of those who are ambitious for thorough, scientific training to meet in an effective way the various practical and technical problems found in the various vocational activities. These afford the nearest possible home equivalent of a college education, and offer the particular advantage of utilizing the practical situations of life as their laboratory and shop exercises. For full information concerning the Vocational Courses, send for Part II of the Home-study Service Announcement.

3. *Credit Courses*, which are offered for those who for any reason are unable to attend school and wish to do work of a type that can be used for college or high-school credit. These courses are also of value to those who wish to use their time to advantage when school is not in session. For further information concerning Credit Courses, send for Part III of the Home-study Service Announcement.

4. *Special Courses for Teachers*, which are a series designed as helps for teachers of industrial, agricultural and home-economics subjects. A particular effort is made in these courses to make available to the teachers of the State all the materials and aids which the Kansas State Agricultural College can offer them.

5. *Emergency Courses*. During the war a number of these courses were offered to help meet the new difficulties and duties imposed. It is the purpose of the department to continue a service of this kind. Whenever new situations arise calling for such courses, requests for them will be appreciated.

6. *Study Centers*. Under regulations established for this purpose, study centers may be arranged where college subjects may be studied under the personal direction of members of the College Faculty.

7. *Information Service*, the purpose of which is to afford a definite source to which technical or informational questions may be referred. All such questions which are referred to the Home-study Service will be promptly answered if possible, or referred to a specialist in the College or elsewhere, who will supply the information desired.

8. *Lantern-slide Service*. A number of sets of lantern slides on agricultural, industrial and home economics subjects have been prepared by specialists in the College with particular reference to Kansas conditions. These will be loaned, free of cost (except transportation charges), to any responsible resident of Kansas. For further information concerning these, inquiries should be addressed to the Home-study Service of the College.

FREE READING COURSES

The following Free Reading Courses are now in circulation. Others will be added as need arises and materials become available. These courses, including the bulletins and other publications containing the subject matter, are free to residents of Kansas, not because it costs nothing to offer them, but because it is felt that the service is due without direct charge to those who can use it to advantage, just as are many other services from state-supported institutions.

Soils and Fertility

(Including related subjects)

- RA 1. Soil Fertility
- RA 2. Land Drainage
- RA 3. Humus
- RA 5. Green Manuring
- RA 6. Commercial Fertilizers

Farm Crops

(Including related subjects)

- RA 101. Growing Corn in Kansas
- RA 102. Seed Selection for Crop Improvement
- RA 103. Wheat and Its Culture
- RA 104. Wheat in Western Kansas
- RA 105. Preparing the Land for Wheat
- RA 108. Grain Smuts
- RA 109. Growing Sorghum in Kansas
- RA 110. Feterita and Its Culture
- RA 111. Milo and Its Culture
- RA 113. Sorghum Sirup Manufacture
- RA 114. Sudan Grass and Its Culture
- RA 115. Broom Corn and Its Culture
- RA 116. Corn Growing Under Droughty Conditions
- RA 117. Meadow and Pasture Grasses
- RA 118. Rape and Its Culture
- RA 120. Cowpeas and Their Culture
- RA 123. Red Clover and Its Culture
- RA 124. Sweet Clover and Its Culture

Garden Crops

(Including related subjects)

- RA 201. The Home Vegetable Garden
- RA 204. Sweet Potatoes and Their Culture
- RA 207. Diseases of Cabbage and Cauliflower
- RA 209. Cucumbers and Their Culture
- RA 214. Increasing the Potato Yield by Spraying

Orchard Crops

(Including related subjects)

- RA 304. Insect and Fungous Enemies of the Apple
- RA 305. The Peach and Its Culture
- RA 306. Spraying Peaches
- RA 307. The Pear and Its Culture

Small Fruits

(Including related subjects)

- RA 401. The Home Fruit Garden
- RA 402. Plant Propagation
- RA 403. Strawberries and Their Culture
- RA 405. Grapes and Their Culture
- RA 406. Grape Diseases and Pests
- RA 407. Orchard Spraying
- RA 409. Blackberry Culture

Ornamental Plants

(Including related subjects)

- RA 504. Tree Culture
- RA 505. Trees for Western Kansas
- RA 506. Black Walnuts
- RA 507. The Hardy Catalpa

Farm Animals

(Including related subjects)

- RA 601. Breeds of Draft Horses
- RA 602. Breeds of Light Horses
- RA 603. Feeding Work Horses
- RA 604. Unsoundness in Horses
- RA 605. Horse Breeding Suggestions
- RA 606. Growing Draft Colts
- RA 608. Blind Staggers
- RA 611. Breeds of Beef Cattle
- RA 612. Feeding Cattle
- RA 613. Production of Baby Beef
- RA 614. Cottonseed Meal for Feeding Beef Cattle
- RA 622. Dairy Farming
- RA 623. How to Raise Calves on Skim Milk
- RA 624. Production of Clean Milk
- RA 631. Breeds of Sheep
- RA 632. Sheep Raising
- RA 641. Breeds of Swine
- RA 643. Self-feeders for Swine
- RA 645. Hog Cholera
- RA 646. Hogging down Crops
- RA 648. Tuberculosis of Hogs
- RA 651. Breeds of Poultry
- RA 652. Poultry Management
- RA 653. Incubation of Eggs
- RA 654. Brooding of Chickens
- RA 655. Mites and Lice on Poultry
- RA 656. Important Poultry Diseases
- RA 657. Backyard Poultry Keeping

- RA 659. Turkey Raising
- RA 660. Duck Raising
- RA 661. Goose Raising
- RA 662. The Guinea Fowl
- RA 663. Squab Raising
- RA 671. Meat on the Farm
- RA 672. Killing Hogs and Curing Pork
- RA 681. Making and Feeding Silage
- RA 682. Feeding Grain Sorghums to Live Stock
- RA 683. Utilizing Farm Wastes in Feeding Live Stock
- RA 691. Some Common Disinfectants
- RA 694. Tuberculosis.

Insects

(Including related subjects)

- RA 702. The Hessian Fly
- RA 703. Insect Pests of Alfalfa
- RA 704. The Spring Cankerworm
- RA 705. Insects Injurious to Stored Grains
- RA 706. The White Grub
- RA 707. The Honey Bee
- RA 708. Comb Honey Production

- RA 709. Treatment of Bee Diseases
- RA 710. Outdoor Wintering of Bees
- RA 711. Transferring Bees to Modern Hives
- RA 712. White Ants
- RA 713. Important Insecticides
- RA 714. How to Detect Insect Outbreaks
- RA 715. Methods of Controlling Grass-hoppers
- RA 716. Collection and Preservation of Insects

Agricultural Economics and Sociology

- RA 801. How to Use Farm Credit
- RA 802. The Farmer's Living
- RA 803. Community Welfare
- RA 804. Coöperative Live Stock Shipping Associations

Miscellaneous Agricultural Subjects

- RA 901. Bindweed
- RA 902. Canada Thistles
- RA 903. Some Useful Birds
- RA 904. The Pocket Gopher
- RA 906. Weeds: How to Control Them

INDUSTRIAL READING COURSES

Farm Machinery

- RI 2. Corn Cultivators
- RI 3. Corn Harvesting Machinery
- RI 4. Care and Repair of Plows and Harrows
- RI 5. Care and Repair of Mowers, Reapers, and Binders
- RI 6. Operation of Threshing Machines
- RI 7. Farm Tractor

Farm Shop

- RI 102. The Use of Paint
- RI 104. Rope Work

Storage of Perishable Farm Produce

- RI 201. Sweet Potato Storage

Farm Concrete Work

- RI 303. Concrete Silo Construction
- RI 304. Concrete Fence Posts

Roads in the Country

- RI 401. Benefits of Improved Roads
- RI 402. Sand, Clay and Burnt Clay Roads
- RI 403. The Road Drag and How to Use It
- RI 404. Macadam Roads
- RI 405. Highway Improvement

Drainage and Irrigation

- RI 501. Information for Beginners
- RI 502. The Construction of Small Irrigation Ditches
- RI 504. Orchards

- RI 505. Grain Fields
- RI 506. Sugar Beets
- RI 507. Alfalfa
- RI 508. Drainage of Irrigated Lands
- RI 512. Farm Reservoirs
- RI 513. Pumping for Irrigation

Farm Buildings

- RI 601. Dairy House Construction
- RI 604. Ice Houses
- RI 606. Hog Houses
- RI 607. Ventilation of Stables

Miscellaneous Industrial Subjects

- RI 701. Farm Wood Lot
- RI 703. Farm Sewage Disposal
- RI 705. Fire Prevention
- RI 706. Farm Lighting
- RI 707. Preservative Treatment of Farm Timbers
- RI 708. Home Conveniences
- RI 710. Lightning and Lightning Conductors
- RI 713. Fly-trap Construction
- RI 715. Bird-house Construction

Foods and Nutrition

- RHE 1. Nutrition
- RHE 2. What the Body Needs
- RHE 4. Foods Rich in Protein
- RHE 5. Milk, the Indispensable Food for Babies

Preparation of Foods

- RHE 102. Cheese
 RHE 104. Vegetables
 RHE 105. Food for Young Children
 RHE 106. School Lunches

Proteins

- RHE 210. How to Make Cottage Cheese
 on the Farm

Carbohydrates, or Starches and Sugars

- RHE 301. Sugar as Food
 RHE 302. Maple Sugar
 RHE 303. Sorghum Sirup
 RHE 304. Use of Honey
 RHE 306. The Native Persimmon
 RHE 308. Okra
 RHE 310. Sugar Beet Sirup
 RHE 311. Common Edible Mushrooms

Cereals

- RHE 401. Food Value of Corn, Kafir,
 and Cowpeas
 RHE 402. Ways of Using Cornmeal
 RHE 403. Popcorn
 RHE 404. Corn as Food

Preservation of Foods

- RHE 501. Home Care of Foods
 RHE 502. Milk

- RHE 507. Grape Juice
 RHE 508. Preserving Apples by Evapo-
 ration
 RHE 510. Home Uses for Muscadine
 Grapes
 RHE 511. Canning Instructions
 RHE 512. Drying Fruits and Vegetables
 in the Home
 RHE 513. Preservation of Vegetables by
 Fermentation and Salting
 RHE 514. Home-made Fruit Butters

Household Pests

- RHE 602. Fleas and Their Control
 RHE 603. Carpet Beetle
 RHE 604. House Centipede
 RHE 608. House Flies
 RHE 609. House Ants
 RHE 610. Silverfish
 RHE 611. Harvest Mites, or Chiggers
 RHE 612. The Bedbug

Fats and Oils

- RHE 701. Economical Uses of Fat
 RHE 702. Peanut Oil
 RHE 703. Making Butter on the Farm

Household Management

- RHE 801. The Farm Kitchen as Workshop

VOCATIONAL COURSES

SUBJECTS COVERED. Vocational courses treat subjects covered in the three general fields, *Agriculture*, *Industry* and *Home Economics*. The list which follows is being revised from time to time according to demands.

BY WHOM CONDUCTED. The courses are prepared and taught by specialists in correspondence study, who keep in close touch with the College Faculty in their respective fields.

METHODS OF WORK. Each course is based upon a recognized standard text treating the subject, and is covered in a number of definite lessons, ranging from ten to twenty. A written report is required of the student on each lesson, according to instructions sent upon enrollment.

EXAMINATIONS. Examinations in courses completed may be taken at the College or locally under the direction of some suitable person with which arrangements can be made, such as a county superintendent or city superintendent.

FEES The enrollment fee for a single vocational course is \$3, or for a complete group of eight courses, \$15 (\$6 and \$30 to nonresidents of Kansas). The payment of five single enrollments entitles the student to the three additional courses free of charge.

BOOKS AND STATIONERY. Students will be expected to provide all textbooks, drawing instruments, stationery and other materials required in their courses, and to pay postage on the lessons sent in.

AGRICULTURE

Agronomy

Required subjects:

1. EA 1. Essentials of Agriculture
 2. EA 2. Elementary Agricultural Chemistry
 3. EA 3. Soils
 4. EA 4. Grain Crops
 5. EA 5. Forage Crops
- (Select three additional subjects from list of electives.)

Horticulture

Required subjects:

1. EA 1. Essentials of Agriculture
 2. EA 2. Elementary Agricultural Chemistry
 3. EA 3. Soils
 4. EA 6. Gardening
 5. EA 7. Orchardring
- (Select three additional subjects from list of electives.)

Animal Husbandry

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry

3. EA 8. Feeds and Feeding
 4. EA 9. Animal Breeding
 5. EA 10. Types and Breeds
- (Select three additional subjects from list of electives.)

Dairying

Required subjects:

1. EA 1. Essentials of Agriculture
 2. EA 2. Elementary Agricultural Chemistry
 3. EA 8. Feeds and Feeding
 4. EA 11. Farm Dairying
 5. EA 9. Animal Breeding
- (Select three additional subjects from list of electives.)

Poultry Husbandry

Required subjects:

1. EA 1. Essentials of Agriculture.
 2. EA 2. Elementary Agricultural Chemistry
 3. EA 8. Feeds and Feeding
 4. EA 9. Animal Breeding
 5. EA 12. Poultry Production
- (Select three additional subjects from list of electives.)

ELECTIVE SUBJECTS APPLYING TO THE AGRICULTURAL COURSES

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|---------------------------|------------------------------|
| EA 3. Soils | EA 16. Greenhouse Management |
| EA 4. Grain Crops | EA 17. Floriculture |
| EA 5. Forage Crops | EA 18. Landscape Gardening |
| EA 6. Gardening | EA 19. Farm Forestry |
| EA 7. Orchardring | EA 22. Diseases of Animals |
| EA 8. Feeds and Feeding | EA 24. Horse Production |
| EA 9. Animal Breeding | EA 25. Dry-land Farming |
| EA 10. Types and Breeds | EA 26. Beef Production |
| EA 11. Farm Dairying | EA 27. Pork Production |
| EA 12. Poultry Production | EA 31. Farm Management |

By special arrangement with this department, students may choose from other lists of electives described hereafter.

INDUSTRIAL

Carpentry and Building

Required Subjects:

1. EI 1. Shop Mathematics
 2. EI 2. Mechanical Drawing, Applied
 3. EI 3. Architectural Drawing
 4. EI 4. Constructive Carpentry and Inside Finishing
 5. EI 5. Heating and Ventilating
- (Select three additional subjects from list of electives.)

Stationary Engineering

Required subjects:

1. EI 1. Shop Mathematics
2. EI 2. Mechanical Drawing, Applied
3. EI 11. Steam Boilers and Engines

4. EI 12. Gasoline Engines
 5. EI 13. Blacksmithing
- (Select three additional subjects from list of electives.)

Highway Improvement I

Required subjects:

1. EI 8. Concrete Construction
 2. EI 15. Highway Construction
 3. EI 16. Roads and Pavements
 4. EI 19. Bridge and Culvert Construction
 5. EI 28. Strength of Materials
- (Select three additional subjects from list of electives.)

Farm Engineering

Required subjects:

1. EI 6. Farm Drainage
 2. EI 7. Farm Buildings
 3. EI 8. Concrete Construction
 4. EI 9. Farm Blacksmithing
 5. EI 10. Farm Machinery
- (Select three additional subjects from list of electives.)

Highway Improvement II

Required subjects:

1. EI 14. Plane Surveying
2. EI 2. Mechanical Drawing, Applied
3. EI 16. Roads and Pavements

4. EI 28. Strength of Materials

5. EI 30. Structural Engineering
- (Select three additional subjects from list of electives.)

Machine Shop and General Repairing

Required subjects:

1. EI 1. Shop Mathematics
 2. EI 2. Mechanical Drawing, Applied
 3. EI 13. Blacksmithing
 4. EI 17. Automobiles
 5. EI 18. Machine Shop Work
- (Select three additional subjects from list of electives.)

ELECTIVE SUBJECTS APPLYING TO THE INDUSTRIAL COURSES

- | | |
|---|--|
| EI 1. Shop Mathematics | EI 15. Highway Construction |
| EI 2. Mechanical Drawing, Applied | EI 16. Roads and Pavements |
| EI 3. Architectural Drawing | EI 17. Automobiles |
| EI 4. Constructive Carpentry and Inside Finishing | EI 18. Machine Shop Work |
| EI 5. Heating and Ventilating | EI 19. Bridge and Culvert Construction |
| EI 6. Farm Drainage | EI 20. Elementary Woodworking |
| EI 7. Farm Buildings | EI 21. Farm Woodworking |
| EI 8. Concrete Construction | EI 23. Gasoline and Oil Traction Engines |
| EI 9. Farm Blacksmithing | EI 24. Pattern Making |
| EI 10. Farm Machinery | EI 25. Plumbing |
| EI 11. Steam Boilers and Engines | EI 26. Practical Electricity |
| EI 12. Gasoline Engines | EI 27. Sheet Metal Drafting |
| EI 13. Blacksmithing | EI 28. Strength of Materials |
| EI 14. Plane Surveying | EI 29. Steam Traction Engines |
| | EI 30. Structural Engineering |

By special arrangement with this department students may choose from other lists of electives set forth in this pamphlet.

HOME ECONOMICS

Domestic Science

Required subjects:

1. EH 1. Household Management
 2. EH 2. Foods and Cookery I
 3. EH 3. Foods and Cookery II
 4. EH 9. Home Nursing
- (Select three additional subjects from list of electives.)

Domestic Art

Required subjects:

1. EH 1. Household Management
 2. EH 5. Sewing I
 3. EH 6. Sewing II
 4. EH 8. Educative Millinery
 5. EH 11. Home Decoration
- (Select three additional subjects from list of electives.)

General Course in Home Economics

Required subjects:

1. EH 1. Household Management
 2. EH 2. Foods and Cookery I
 3. EH 5. Sewing I
 4. EH 9. Home Nursing
 5. EH 11. Home Decoration
- (Select three additional subjects from list of electives.)

ELECTIVE SUBJECTS APPLYING TO THE HOME ECONOMICS COURSES

- | | |
|-----------------------------|--|
| EH 2. Foods and Cookery I | EH 9. Home Nursing |
| EH 3. Foods and Cookery II | EH 10. Home Sanitation |
| EH 5. Sewing I | EH 11. Home Decoration |
| EH 6. Textiles | EH 14. Child Life and Care of Children |
| EH 7. Elementary Needlework | EH 16. Costume Design |
| EH 8. Educative Millinery | EH 17. Laundering |

CREDIT COURSES

GRADES OF WORK. Credit courses are offered in both high-school, or entrance-credit subjects, and college subjects. The courses in each case are the full equivalent of resident courses in like subjects.

BY WHOM CONDUCTED. The courses are prepared under the supervision of the heads of departments of the Agricultural College Faculty, and are taught by specialists in correspondence study under the same regulations that govern resident work.

EXAMINATION. Examinations may be taken at the College or under conditions approved by the College. In the latter case, arrangements can often be made with the local county superintendent, or city superintendent of schools, to conduct the examination.

REGULATIONS 1. Enrollments for correspondence-study work will be received at any time during the year, and students may continue their work uninterrupted throughout the entire year.

2. Correspondence students will be expected to complete any course for which they are enrolled within twelve months from the date of enrollment.

3. Not more than two courses are advised by correspondence at any one time. It is recommended that a student carry but one subject at a time, particularly where only part of the time is given to the work.

4. Each subject listed under the various departments constitutes what is known as a correspondence "course."

5. Students enrolling for correspondence courses must meet the prerequisites the same as if undertaking the work in residence.

6. A student may not be enrolled for correspondence work while in attendance at any institution of learning without special permission from the Dean or proper authorities in the institution of which he is a student.

FEES. An enrollment fee of \$10 is charged for residents of Kansas; \$15 for nonresidents. For this amount the student is entitled to eight semester hours of college work, or three semester credits of high-school work, and is given a year in which to finish them. No fee is refunded because of the student's inability to enter upon the course for which once registered. Extensions of time can be granted only where the work has been delayed because of personal illness of the student. All such cases must be taken up individually with the director of this department.

BOOKS AND STATIONERY. Students will be expected to provide all textbooks, drawing outfits, stationery and other materials required in their courses, also to pay postage on lessons one way.

FOR WHOM INTENDED. Though credit courses offered by the Home-study Service are still limited, the number is steadily growing, and it is the purpose of the department to add courses whenever a demand for them becomes evident. The other types of work are sufficiently broad to be of value to a great variety of people. The following classes in particular should be able to profit by them:

1. Those who have completed a common-school course, but for any reason are unable to attend high school.
2. High-school graduates temporarily or permanently unable to attend college.
3. Students whose attendance at high school or college has been interrupted.
4. Students who for any reason have fallen behind in their work and wish to use their spare time catching up.
5. The strong, aggressive student who does not wish to halt his progress for vacations and other interruptions.
6. High-school and grade classes in practical courses that need supplementing and enrichment.
7. Teachers who wish further professional or other training, or who need help in planning and conducting their work.
8. Professional and business men who wish to keep growing along some line of interest, professional or avocational.
9. Clubs and other organizations which wish to make systematic studies.
10. Men and women who wish effective help in meeting the demands in their vocations for technical and scientific knowledge and training.

COURSES OF INSTRUCTION.

The list of Credit Courses offered is being extended constantly, the new courses added in each case being those for which there seems to be the most demand. The following is the present list:

HIGH-SCHOOL COURSES

| | <i>Agriculture</i> | <i>Units of credit.</i> | <i>Assignments.</i> |
|---------------------------------------|--------------------|-------------------------|---------------------|
| PCA 1. Elementary Agriculture I..... | | $\frac{1}{2}$ | 20 |
| PCA 2. Elementary Agriculture II..... | | $\frac{1}{2}$ | 20 |
| | <i>Drawing</i> | | |
| PCD 3. Mechanical Drawing I..... | | $\frac{1}{2}$ | 20 |
| PCD 4. Mechanical Drawing II..... | | $\frac{1}{2}$ | 20 |
| | <i>English</i> | | |
| PCE 1. Grammar and Composition..... | | $\frac{1}{2}$ | 20 |
| PCE 2. Literature | | $\frac{1}{2}$ | 20 |
| PCE 3. Composition | | $\frac{1}{2}$ | 20 |
| PCE 4. Literature | | $\frac{1}{2}$ | 20 |
| PCE 5. Composition | | $\frac{1}{2}$ | 20 |
| PCE 6. Literature | | $\frac{1}{2}$ | 20 |
| | <i>Mathematics</i> | | |
| PCM 1. Algebra I | | $\frac{1}{2}$ | 20 |
| PCM 2. Algebra II | | $\frac{1}{2}$ | 20 |
| PCM 3. Algebra III | | $\frac{1}{2}$ | 20 |
| PCM 4. Plane Geometry I..... | | $\frac{1}{2}$ | 20 |
| PCM 5. Plane Geometry II..... | | $\frac{1}{2}$ | 20 |
| PCM 6. Solid Geometry | | $\frac{1}{2}$ | 20 |

| | <i>History</i> | <i>Units of credit.</i> | <i>Assignments.</i> |
|---------------------------------|----------------|-------------------------|---------------------|
| PCH 1. Greek History | | ½ | 20 |
| PCH 2. Roman History | | ½ | 20 |
| PCH 3. Medieval History | | ½ | 20 |
| PCH 4. Modern History | | ½ | 20 |
| PCH 5. American History I..... | | ½ | 20 |
| PCH 6. American History II..... | | ½ | 20 |

History (Alternative arrangement)

| | | |
|---------------------------------|---|----|
| PCH-A. Ancient History | ½ | 20 |
| PCH 3. Medieval History | ½ | 20 |
| PCH 4I. Modern History I..... | ½ | 20 |
| PCH 4II. Modern History II..... | ½ | 20 |
| PCH 5. American History I..... | ½ | 20 |
| PCH 6. American History II..... | ½ | 20 |

COLLEGE CREDIT COURSES

DIVISION OF AGRICULTURE

| | <i>Agronomy</i> | <i>Semester credits.</i> | <i>Assignments.</i> |
|--|-------------------------|--------------------------|---------------------|
| CA 3. Grain Crop Production..... | | 2 | 16 |
| CA 4. Forage Crop Production..... | | 2 | 16 |
| | <i>Animal Husbandry</i> | | |
| CL 1. Types and Classes of Live Stock..... | | 1 | 8 |
| CL 2. History of Breeds..... | | 2 | 16 |
| CL 3. Principles of Feeding..... | | 3 | 24 |

Horticulture

| | | |
|--|---|----|
| CH 1. Orcharding | 2 | 16 |
| CH 2. Gardening | 3 | 24 |
| CH 3. Floriculture | 2 | 16 |
| CH 4. Green-house Construction and Management..... | 3 | 24 |
| CF 1. Farm Forestry | 2 | 16 |

Poultry Husbandry

| | | |
|-------------------------------------|---|---|
| CPP 1. Farm Poultry Production..... | 1 | 8 |
|-------------------------------------|---|---|

DIVISION OF ENGINEERING

| | | |
|-----------------------------------|---|----|
| CE 5. Concrete Construction | 1 | 8 |
| *CE 2. Mechanical Drawing I..... | 2 | 16 |
| *CE 6. Mechanical Drawing II..... | 3 | 24 |
| CE 4. Kinematics | 3 | 24 |

Civil Engineering

| | | |
|----------------------------------|---|----|
| CE 1. Highway Engineering I..... | 2 | 16 |
|----------------------------------|---|----|

Shop Practice

| | | |
|-------------------------|---|----|
| *CE 7. Metallurgy | 2 | 16 |
|-------------------------|---|----|

Steam and Gas Engineering

| | | |
|--------------------------------------|---|----|
| CE 3. Farm Motors | 2 | 16 |
| CE 8. Heating and Ventilation A..... | 2 | 16 |
| CE 9. Airplane Mechanics | 1 | 18 |

DIVISION OF HOME ECONOMICS

Domestic Art

| | | |
|-----------------------|---|----|
| CHE 1. Textiles | 2 | 16 |
|-----------------------|---|----|

* In preparation.

| <i>Domestic Science</i> | | <i>Semester credits.</i> | <i>Assign- ments.</i> |
|---------------------------------|----------------------------------|------------------------------|---------------------------|
| *CHE 2. | Foods I | 1 | 8 |
| DIVISION OF GENERAL SCIENCE | | | |
| <i>Economics and Sociology</i> | | | |
| CEC 1. | Economics | 3 | 24 |
| CEC 2. | Agricultural Economics | 3 | 24 |
| CS 2. | Rural Sociology | 3 | 24 |
| CS 3. | Sociology | 3 | 24 |
| <i>Education (Professional)</i> | | | |
| CP 1. | Industrial Education | 3 | 24 |
| CP 2. | Educational Psychology | 3 | 24 |
| CP 4. | History of Education | 3 | 24 |
| CP 5. | Principles of Education | 3 | 24 |
| CP 6. | Methods of Teaching | 3 | 24 |
| CP 7. | Educational Administration | 3 | 24 |
| CP 8. | Psychology | 3 | 24 |
| CP 9. | School Discipline | 2 | 16 |
| CP 10. | Rural Education | 3 | 24 |
| CP 11. | Agricultural Education | 2 | 16 |
| CP 12. | Home Economics Education | 2 | 16 |
| <i>English</i> | | | |
| CCE 1. | College Rhetoric I | 3 | 24 |
| CCE 2. | College Rhetoric II | 3 | 24 |
| CCE 3. | Business English | 3 | 24 |
| CCE 4. | The Short Story | 3 | 24 |
| <i>Geology</i> | | | |
| CG 1. | Dynamic Geology | 2 | 16 |
| <i>Mathematics</i> | | | |
| CM 7. | Plane Trigonometry | 3 | 25 |

* In preparation.

Student Organizations

THE STUDENTS' SELF-GOVERNING ASSOCIATION

The Students' Self-Governing Association was organized on broad lines in the spring of 1919, with the whole-hearted approval and sanction of the Faculty. The association was formed "for the purpose of placing the control and advancement of student interests and activities in the hands of the student body itself, with the firm belief that this arrangement will cause an increased self-control, resulting in higher ideals and better coöperation, and that officers of sufficient wisdom and maturity may be found so that appeal to College authorities shall be unnecessary."

All students enrolled under any department of the College are eligible for membership. The annual membership fee is 50 cents. Special dues to include admission to student activities may be voted by the association.

The officers of the association are a president and a vice president, elected by the association as a whole, and a secretary and a treasurer, elected by the executive council of the association.

The supreme governing council of the Student Association is known as the executive council. This body consists of nineteen members, and its membership is made up as follows: The president and the vice president of the association; two members from each of the College classes; two from the Literary Society Council; one from the Women's Pan-Hellenic Council; one from the Men's Pan-Hellenic Council; one from the "K" fraternity; one from the Women's Athletic Association; one from the Y. W. C. A. cabinet; one from the Y. M. C. A. cabinet; and one from the School of Agriculture. Regular meetings of the council are held once a month.

There are standing committees on discipline, finance, social affairs, calendar, school spirit, and points, and other temporary or standing committees may be provided for from time to time as occasion demands. All chairmen of committees are appointed by the executive council. Each chairman submits a list of members desired for his committee, which appointments must be ratified by the executive committee before they become effective.

All regulations passed by the executive council, by committees, and by the entire association, are considered valid and binding upon all students in so far as said actions are not disapproved by the Faculty and the President of the College.

THE STUDENT COUNCIL

The Student Council was a representative body which was organized in 1909, received official sanction from the Board of Regents and the Faculty of the College, and functioned successfully until replaced in the spring of 1919 by the Students' Self-governing Association and its executive council.

The Student Council consisted of four members elected from the senior class, three from the junior, two from the sophomore, and one from the freshman class. In addition, the School of Agriculture elected a delegate, who had the privilege of speaking on subjects pertaining to his school, but had no vote. At each meeting of the council a member of the Faculty was privileged to be present and to participate in the discussions.

The Student Council occupied an interesting and valuable place in the College life, and as a whole may be said to have been an unqualified success in establishing a system of representative government among the students, touching affairs peculiarly their own, and also in matters involving the Faculty. All acts of the Students' Council were submitted to the President and Faculty for approval.

THE CHRISTIAN ASSOCIATIONS

The Young Men's Christian Association and the Young Women's Christian Association are organizations of the greatest worth and value in the College community, forming centers of moral culture and religious stimulus among the young men and women during their developmental period. As is well known, the Christian associations in colleges stand for the best ideals among the students, and are always accorded the cordial support of the authorities. In addition to general moral and spiritual development, the College Christian associations are of practical and efficient influence among the students in many directions.

THE YOUNG MEN'S CHRISTIAN ASSOCIATION

The College Y. M. C. A. has always been a strong and influential body among the students. Its growth may be indicated by the fact that the organization was able in 1908 to erect a handsome building for its purposes at a cost of \$35,000, on the corner of Eleventh and Fremont streets, near the College grounds.

This building contains reading rooms, committee rooms, students' living rooms, gymnasium, etc. All young men are welcome to make use of the privileges of the building, whether members or not. No fixed fees for membership are charged, each member giving whatever he feels able to afford. One of the useful and practical features of the Y. M. C. A. is a students' employment bureau, which is maintained for the benefit of all students seeking employment. The religious work of the organization includes various courses for the study of the Bible and the work of Christian missions, which are maintained through the winter. The regular religious meetings of the association occur on Thursday evenings from 6:45 to 7:30, while occasional Sunday afternoon meetings are also held. Special meetings and receptions, which serve to broaden the acquaintanceship of the students and promote good-fellowship, are arranged from time to time. Especial attention is given the new students on and after their arrival, and assistance is rendered in securing rooms and boarding places for them. The association maintains a regular secretary, with whom prospective students are cordially encouraged to correspond. Address General Secretary, Y. M. C. A., Kansas State Agricultural College, Manhattan, Kan.

THE YOUNG WOMEN'S CHRISTIAN ASSOCIATION

Similar in aim and purpose to the organization of the young men is the Young Women's Christian Association. The Home Economics Hall is the headquarters of the association, to which all young women of the College are at all times cordially welcome. An office for the general secretary and rest rooms for the young women are maintained in this building during the College year.

An employment bureau for women students is maintained by the general secretary, without charge to its beneficiaries. Various committees are responsible for the lines of work of the association. At the opening of the College semesters the incoming trains are met by "Big Sisters," who assist new women students, the "Little Sisters," in securing suitable lodging and boarding places. If any prospective woman student will write to the general secretary of the association, her "Big Sister" will correspond with her during the summer vacation.

During the College year various social functions are held for the young women. The first of these is an informal reception to enable the College girls to become acquainted with one another. Once each year the two associations entertain jointly.

The religious life of the young women is fostered by the weekly vesper services in the Home Economics Hall. The different churches of the city extend a cordial welcome to the College women, and through the efforts of the association they are encouraged to active participation in the services of the church of their choice.

THE NEWMAN CLUB

The Newman Club, an organization of Catholic students, holds a social meeting every other Friday evening, and on the alternate Friday evenings the time is devoted to some line of religious study under the direction of the local pastor. The College authorities recognize this Bible study by allowing a two-hour credit for it when properly certified. In further recognition of the club's efforts the College has placed a set of the new Catholic Encyclopedia on its library shelves. Furthermore, the club has purchased and placed in the College Library nearly one hundred dollars' worth of Catholic books and pamphlets.

The club is now on a sound basis and is qualifying for affiliation with a national organization of Newman clubs of the various state universities and colleges. Its aim is to favorably influence new Catholic students in the knowledge and practice of their faith, to foster sound morality and good character.

THE HENRY SCATTERGOOD FRIENDLY GROUP

The Henry Scattergood Friendly Group, an organization of the Society of Friends young people, holds its regular meeting Sunday afternoons during the College year, and considers the problems confronting the student in his religious and civil life. It aims to find in Christian association a broader spiritual service in College life.

To prospective students, the group offers a cordial welcome.

LITERARY AND SCIENTIFIC SOCIETIES

The literary societies of the College, eight in number, are wholly student organizations, holding weekly meetings in the College buildings. The Alpha Beta and Franklin literary societies are open to both sexes; the Ionian, Eurodelphian and Browning societies admit only young women to membership; the Webster, Hamilton and Athenian societies admit young men only. Students are encouraged to join one of these organizations for the sake of practice in the use of language, training in debate, and general experience in conducting meetings and in dealing with their fellows. These societies jointly maintain a debating council, which coöperates with a Faculty committee in arranging for all intercollegiate and interstate debates participated in by representatives of the College. The oratorical board, similarly maintained by these societies, arranges for the intersociety oratorical contest.

In the School of Agriculture there are two literary societies; one for young men, the Lincoln, and one for young women, the Philomathian. These societies have the same general aims and purposes as those in the College.

AGRICULTURAL SOCIETIES

The Block and Bridle Club meets on the first and third Mondays of each month. Membership is open to all animal husbandry students above the freshman year. The object of the club is to promote the interests of animal husbandry in the College and in the State. Live-stock problems of all kinds are taken up, and members of the Faculty and outside speakers are secured for addresses on special topics. The College section of the American Society of Agronomy meets on call of the president of the society. The membership includes students and instructors interested in agronomy and in allied subjects. The purpose of the society is to promote the development of agronomic work and methods, in harmony with the purpose of the organization of this name. The Agricultural Association meets Monday evenings. All students interested in agriculture are eligible to membership. The object of the association is to promote the general interests of agriculture in the College and State. The Klod and Kernel Klub meets on the first and third Tuesdays of each month. Junior and senior agronomy students are eligible to membership.

ENGINEERING SOCIETIES

The various technical societies of the Division of Engineering meet weekly in departmental seminars for lectures, presentation of papers, and discussion of notable articles appearing in the technical press or in the journals of the national societies. On special occasions all of the societies meet together as the Engineers' Association, for lectures by eminent practicing engineers.

The students in mechanical and electrical engineering are organized as student branches of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers, respectively.

The purpose of these various societies is to acquaint the students with the latest development in the fields of engineering and architecture, to

give them more definite ideas as to the opportunities in their professions and the requirements for success in their profession, to promote acquaintance and fellowship among the students, and to further the interest of the Division of Engineering in the College and the State.

THE COLLEGE BAND

The College Band is a military organization, composed of cadets assigned to this duty for the College year in lieu of drill and technical military instruction. The Band is limited in its membership, and attendance of the members upon its exercises is obligatory. It has proved an effective aid to the cadet corps, stimulating a love for martial music, and affording an attractive feature of the various public ceremonial occasions at the College.

THE COLLEGE ORCHESTRA

The Orchestra is a student organization connected with the Department of Music, membership in which is voluntary. Its daily training under competent leadership results in the acquisition of a considerable repertoire of musical compositions of the best quality. Those connected with the Orchestra obtain in this way familiarity with the works of many of the great composers, and among the students at large the Orchestra is an efficient aid in cultivating a taste for and an appreciation of good music.

ATHLETIC ORGANIZATIONS

By means of the gymnasium the College is prepared to give complete physical as well as mental training. This building, which is equipped with all the usual accessories, assists in developing and maintaining physical tone and health in the student body. In addition to the gymnasium classes, and physical training in the military corps of cadets, all young men are encouraged to develop their physical skill by playing on practice teams in various athletic lines. In the fall football teams are organized; in the fall and winter, basket ball; while in the spring baseball, tennis, and track athletics prevail. Every possible encouragement is given all students desirous of participating in these games to enter the practice teams and receive the necessary instruction. The most proficient of these have opportunity to enter the first teams and participate in intercollegiate contests. The College authorities encourage all reasonable and sane athletic development, as a means for the training of physical qualities desirable in men everywhere. Professionalizing tendencies are strictly repressed, and the athletic rules adopted by the Faculty prevent, by proper regulation, all participation in intercollegiate games on the part of students deficient in their studies.

The women students have equal opportunity with young men for general physical training. In the gymnasium, under a physical director, they receive training suitable for their needs. Basket-ball and tennis teams are organized among the young women.

HONORARY ORGANIZATIONS

The honorary organizations consist of fraternities, sororities, and societies. Of these, Alpha Zeta and Gamma Sigma Delta draw their members from students in the Division of Agriculture; Alpha Psi draws its members from the Veterinary Department; Sigma Tau from the Division of Engineering; Omicron Nu from the Division of Home Economics, while the McDowell Club is an honorary organization of women students and teachers of the Department of Music. There are chapters of Sigma Delta Chi and Theta Sigma Phi, journalistic fraternities; of Pi Kappa Delta, the debating fraternity; of Zeta Kappa Psi, the debating sorority. The military students have a chapter of "Scabbard and Blade," the national fraternity; and the athletic men have the "K" fraternity. Of honorary societies there are the Quill Club, composed of those who have gained distinction in writing, and the "Forum," for those who have secured forensic honors.

In addition to these student organizations there is a chapter of Phi Kappa Phi, to which students of the highest scholarship are elected. (See "Honor Societies.")

School of Agriculture

(The Secondary School)

HARRY LLEWELLYN KENT, *Principal*¹

A. P. DAVIDSON, *Associate Principal*

The School of Agriculture is organized to meet the needs of young men and young women of Kansas who may need instruction more closely identified with the life of the farm, home and shop than that provided by the high schools of the State. It is also intended to meet the needs of those men and women who find themselves for any cause unable to complete an extensive course of collegiate instruction, yet who feel the necessity of a practical training for their activities in life. A large part of the student's time in the School will be spent in the laboratories and in contact with the real objects of his future work. An element of culture and general information is provided for in several semesters of English for each course and in work in history, economics, citizenship, physics, and chemistry.

The School of Agriculture is not a school preparatory to the College. Its sole purpose is to fit men and women for life in the open country, and to make country life more attractive; to make the workshop more efficient; in short, to dignify and to improve industrial life. It is not established to entice students away from the high school. It is for those of every walk in life who wish a larger view and greater skill in doing the world's work.

All the resources of the College are at the disposal of the School of Agriculture. Its students have every advantage possessed by students in the College.

THE COURSE OF STUDY

The curriculum in agriculture emphasizes the growing of crops and the raising of live stock. A minimum of theory and a maximum of practical work bring the student into close contact with the actual conditions of farm life.

The curriculum in home economics emphasizes the care of the home. Home decoration, home sanitation, cookery, and sewing receive careful attention.

The curriculum in mechanic arts leads to a trade. It is designed to shorten the time of apprenticeship and to prepare the way for skilled workmanship in shop or factory. The great amount of time spent in the shops should easily lead to skill and efficiency in subsequent work.

ADMISSION. Students who are fourteen years of age or older, and who have completed the eighth grade of the public schools, are admitted with-

1. Resigned.

out examination. Students who have not completed the eighth grade are examined in arithmetic, United States history, English grammar, geography, reading, and spelling. Students who have done work in the public high schools receive credit for work done. Maturity in years and practical experience are given due consideration, but students should not consider these qualifications alone sufficient to admit them. Whenever there is a question about a student's qualifications for entering, he should correspond with the Principal of the School of Agriculture before coming.

The Principal of the School of Agriculture is charged with the execution of all College and Faculty rules relating to the enrollment of students in classes and their choice of studies. Students entering under the age of seventeen years are required to complete one of the three-year curricula as outlined before they choose work not included in the curriculum.

It is greatly to the advantage of the prospective student to see to it that his certificate showing work done in grammar school or high school be sent to the College as soon as possible after his work done there is finished. A permit to register will then be sent him by the Registrar in advance of his coming in September; this will greatly facilitate the work of entrance. The student will present this permit at the registration room in Nichols Gymnasium, and will not be compelled to wait his turn to meet the committee on admission.

Upon registration each student receives a certificate of his standing, which he presents to the Principal of the School, who is charged with the duty of enrolling students in classes, selecting and arranging subjects, and assigning hours.

GRADES AND FAILURES. Examinations are held at stated periods and at such other times as the Faculty may provide. Absence from examination, or ten or more unexcused absences from class periods, severs a student's connection with the institution, which connection can be renewed only through the action of the Principal of the School. Any withdrawals from school or class must be authorized by the Principal; otherwise, continued absence is construed as failure. Parents or guardians are furnished a copy of the record of the student's work at the close of any term, if they so desire.

Curriculum in Agriculture

(SCHOOL OF AGRICULTURE)

The Arabic numeral immediately following the name of subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

FIRST SEMESTER

| | |
|-------------------------|--------|
| Stock Judging I | |
| An. Husb. 51..... | 3(0-6) |
| Industrial Arithmetic A | |
| Math. 51 | 4(4-0) |
| English I | |
| Engl. 51 | 4(4-0) |
| Beginning Poultry | |
| Poult. Husb. 51..... | 2(1-2) |
| Carpentry I | |
| Shop 51 | 2(0-4) |

Physical Training M-I
Phys. Ed. 51A..... 1(0-3)

Music*

SECOND SEMESTER

| | |
|------------------------|-----------|
| Stock Judging II | |
| An. Husb. 52..... | 3(0-6) or |
| Algebra I | |
| Math. 63 | 4(4-0) |
| English II | |
| Engl. 54 | 4(4-0) |
| Breeds and Breeding | |
| An. Husb. 53..... | 2(2-0) |
| Farm Gas Engines I | |
| Farm Engr.* 75..... | 2(1-2) |
| Fruit Growing | |
| Hort. 51 | 3(2-2) |
| Farm Insects | |
| Ent. 62 | 3(2-2) |
| Physical Training M-II | |
| Phys. Ed. 52..... | 1(0-3) |

Music*

SECOND YEAR

FIRST SEMESTER

| | |
|-----------------------|-----------|
| Farm Crops | |
| Agron. 51 | 5(4-2) |
| Elementary Chemistry | |
| Chem. 51 | 4(3-2) |
| English III | |
| Engl. 61 | 4(4-0) |
| Dairying | |
| Dairy Husb. 61..... | 2(1-2) |
| Physical Training M-I | |
| Phys. Ed. 51A..... | 1(0-3) or |
| Military Science I† | |
| Mil. Tr. 101..... | 1(0-4) |

Music*

Elective, 4 credits from the following:

| | |
|-------------------------------|--------|
| Feeds and Feeding | |
| An. Husb. 54..... | 2(2-0) |
| Elementary Dairy Judging | |
| Dairy Husb. 63..... | 1(0-3) |
| Algebra I or II | |
| Math. 63 or 64..... | 4(4-0) |
| Elementary Traction Engines I | |
| Farm Engr. 66..... | 2(0-4) |
| Blacksmithing I | |
| Shop 69 | 2(0-4) |
| Elementary Farm Machinery | |
| Farm Engr. 51..... | 2(1-2) |

SECOND SEMESTER

| | |
|-----------------------------------|-----------|
| Soils and Fertilizers | |
| Agron. 56 | 3(2-2) |
| Elementary Agricultural Chemistry | |
| Chem. 53 | 4(3-2) |
| English IV | |
| Engl. 64 | 4(4-0) |
| Live-stock Production | |
| An. Husb. 55..... | 3(3-0) |
| Physical Training M-II | |
| Phys. Ed. 52..... | 1(0-3) or |
| Military Science II† | |
| Mil. Tr. 102..... | 1(0-4) |

Music*

Elective, 4 credits from the following:

| | |
|-------------------------|--------|
| Elementary Zoölogy | |
| Zoöl. 51 | 3(1-4) |
| Carpentry II | |
| Shop 54 | 3(0-6) |
| Algebra I or II | |
| Math. 63 or 64..... | 4(4-0) |
| Farm Gas Engines II | |
| Farm Engr. 77..... | 3(0-6) |
| Blacksmithing II | |
| Shop 72 | 2(0-4) |
| Concrete Construction I | |
| Ap. Mech. 51, 55..... | 2(1-2) |

* Elective.

† All male students are required to take Physical Training during the first year of their attendance and Military Training during the next year.

THIRD YEAR

| | |
|--|---|
| Elementary Farm Management Ag. Ec. 51..... 3(2-2) | Elementary Agricultural Economics Ag. Ec. 56..... 3(3-0) |
| Physics A-I Physics 51 4(3-2) | Physics A-II Physics 52 4(3-2) |
| English V Engl. 71 3(3-0) | Civics Hist. 63 4(4-0) or |
| American Nation I Hist. 59 4(4-0) | American Nation II Hist. 60 4(4-0) |
| Physical Training M-I Phys. Ed. 51A..... 1(0-3) or | Farm Writing Ind. Jour. 51..... 4(2-4) |
| Military Science I† Mil. Tr. 101..... 1(0-4) | Physical Training M-II Phys. Ed. 52..... 1(0-3) or |
| Music* | Military Science II† Mil. Tr. 102..... 1(0-4) |
| Elective, 5 credits from the following: | Music* |
| Plane Geometry I Math. 66 4(4-0) | Elective, 5 credits from the following: |
| Diseases of Farm Animals Surg. 51 2(2-0) | Plane Geometry II Math. 67 4(4-0) |
| Elementary Grain Marketing Mill. Ind. 52..... 3(2-2) | Physiology and Hygiene Anat. 51 4(4-0) |
| Weed Control and Seed Identification Agron. 58 2(0-4) | Incubation Practice Poult. Husb. 55..... 1(-) |
| | Elementary Bacteriology Bact. 52 3(2-2) |
| | Brooding Practice Poult. Husb. 58..... 1(-) |
| | Elementary Traction Engines II Farm Engr. 69..... 2(0-4) |
| | Elementary Beekeeping Ent. 65 3(2-3) |

Curriculum in Mechanic Arts

(SCHOOL OF AGRICULTURE)

The Arabic numeral immediately following the name of subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

| FIRST SEMESTER | SECOND SEMESTER |
|--|--|
| English I Engl. 51 4(4-0) | English II Engl. 54 4(4-0) |
| Algebra I Math. 63 4(4-0) | Algebra II Math. 64 4(4-0) |
| Free-hand and Object Drawing Arch. 51 3(0-6) | Geometrical Drawing Ap. Mech. 72..... 3(0-6) |
| Farm Gas Engines I Farm Engr. 75..... 2(1-2) | Elementary Traction Engines I Farm Engr. 66..... 2(0-4) |
| Carpentry I Shop 51 2(0-4) | Molding I Shop 96 2(0-4) |
| Concrete Construction I Ap. Mech. 51, 55..... 2(1-2) or | Elementary Botany Bot. 51 3(2-2) or |
| Elementary Botany Bot. 51 3(2-2) | Concrete Construction I Ap. Mech. 51, 55..... 2(1-2) |
| Blacksmithing I Shop 69 2(0-4) | Blacksmithing II Shop 72 2(0-4) |
| Physical Training M-I Phys. Ed. 51 A..... 1(0-3) | Physical Training M-II Phys. Ed. 52..... 1(0-3) |
| Music* | Music* |

* Elective.

† All male students are required to take Physical Training during the first year of their attendance and Military Training during the next year.

SECOND YEAR

FIRST SEMESTER

| | |
|---|-----------|
| English III | |
| Engl. 61 | 4(4-0) |
| Plane Geometry I | |
| Math. 66 | 4(4-0) |
| Physics A-I | |
| Physics 51 | 4(3-2) |
| Shop Drawing I | |
| Ap. Mech. 75, 80..... | 3(1-4) |
| Machine Shop I | |
| Shop 87 | 3(0-6) |
| Military Science I † | |
| Mil. Tr. 101..... | 1(0-4) or |
| Physical Training M-I | |
| Phys. Ed. 51 A..... | 1(0-3) |
| <i>Elective</i> , 3 credits from following: | |
| Concrete Construction II | |
| Ap. Mech. 60..... | 3(0-6) |
| Carpentry II | |
| Shop 54 | 3(0-6) |
| Blacksmithing III | |
| Shop 75 | 3(0-6) |

SECOND SEMESTER

| | |
|---|-----------|
| English IV | |
| Engl. 64 | 4(4-0) |
| Plane Geometry II | |
| Math. 67 | 4(4-0) |
| Physics A-II | |
| Physics 52 | 4(3-2) |
| Shop Drawing II | |
| Ap. Mech. 85, 90..... | 3(1-4) |
| Strength of Materials | |
| Ap. Mech. 70..... | 3(3-0) |
| Military Science II † | |
| Mil. Tr. 102..... | 1(0-4) or |
| Physical Training M-II | |
| Phys. Ed. 52..... | 1(0-3) |
| <i>Elective</i> , 3 credits from following: | |
| Concrete Construction III | |
| Ap. Mech. 65..... | 3(0-6) |
| Carpentry III | |
| Shop 57 | 3(0-6) |
| Farm Gas Engines II | |
| Farm Engr. 77..... | 3(0-6) |
| Blacksmithing IV | |
| Shop 78 | 3(0-6) |

THIRD YEAR

FIRST SEMESTER

| | |
|---|-----------|
| Modern History I † | |
| Hist. 55 | 4(4-0) |
| Solid Geometry | |
| Math. 71 | 4(4-0) |
| Civics | |
| Hist. 63 | 4(4-0) |
| English V | |
| Engl. 71 | 3(3-0) |
| Military Science I † | |
| Mil. Tr. 101..... | 1(0-4) or |
| Physical Training M-I | |
| Phys. Ed. 51 A..... | 1(0-3) |
| <i>Elective</i> , 5 credits from the following: | |
| Blacksmithing V | |
| Shop 81 | 3(0-6) |
| Machine Shop II | |
| Shop 90 | 2(0-4) |
| Carpentry IV | |
| Shop 60 | 2(0-4) |
| Farm Gas Engines III | |
| Farm Engr. 80..... | 3(0-6) |
| Elementary Traction Engines II | |
| Farm Engr. 69..... | 2(0-4) |

SECOND SEMESTER

| | |
|---|-----------|
| Modern History II † | |
| Hist. 56 | 4(4-0) |
| Algebra III | |
| Math. 72 | 4(4-0) |
| Economics | |
| Econ. 51 | 3(3-0) |
| Military Science II † | |
| Mil. Tr. 102..... | 1(0-4) or |
| Physical Training M-II | |
| Phys. Ed. 52..... | 1(0-3) |
| <i>Elective</i> , 8 credits from the following: | |
| Blacksmithing VI | |
| Shop 84 | 3(0-6) |
| Machine Shop III | |
| Shop 93 | 3(0-6) |
| Carpentry V | |
| Shop 63 | 2(0-4) |
| Farm Gas Engines IV | |
| Farm Engr. 82..... | 3(0-6) |
| Elementary Traction Engines III | |
| Farm Engr. 72..... | 2(0-4) |
| Shop Drawing III | |
| Ap. Mech. 95..... | 2(0-4) |

† Ancient History I and II or American Nation I and II may be substituted for Modern History I and II.

‡ All male students are required to take Physical Training during the first year of their attendance and Military Science during the next year.

Curriculum in Home Economics

(SCHOOL OF AGRICULTURE)

The Arabic numeral immediately following the name of subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

FIRST SEMESTER

| | |
|-------------------------|--------|
| Elementary Food Study I | |
| Food and Nut. 55..... | 3(1-4) |
| Garment Making I | |
| Clo. and Text. 57..... | 3(1-4) |
| General Science | |
| Bot. 52 | 4(2-4) |
| English I | |
| Engl. 51 | 4(4-0) |
| Industrial Arithmetic W | |
| Math. 52 | 4(4-0) |

| | |
|-----------------------|--------|
| Physical Training W-I | |
| Phys. Ed. 75 A..... | 1(0-3) |
| Music* | |

SECOND SEMESTER

| | |
|--------------------------|-----------|
| Elementary Food Study II | |
| Food and Nut. 56..... | 3(1-4) |
| Garment Making II | |
| Clo. and Text. 58..... | 3(1-4) |
| El. Design | |
| Ap. Art 51..... | 3(0-6) |
| English II | |
| Engl. 54 | 4(4-0) |
| Algebra I | |
| Math. 63 | 4(4-0) or |
| Gardening | |
| Hort. 56 | 2(1-2) |
| Carpentry H | |
| Shop 66 | 2(0-4) |
| Physical Training W-II | |
| Phys. Ed. 76..... | 1(0-3) |
| Music* | |

SECOND YEAR

FIRST SEMESTER

| | |
|--------------------------------|--------|
| Food Problems I | |
| Food and Nut. 57..... | 2(0-4) |
| Clothing Problems and Design | |
| Clo. and Text. 59..... | 4(2-4) |
| Elementary Chemistry | |
| Chem. 51 | 4(3-2) |
| English III | |
| Engl. 61 | 4(4-0) |
| Household Insects | |
| Ent. 51 | 2(2-0) |
| Economics | |
| Econ. 51 | 3(3-0) |
| Physical Training W-I or W-III | |
| Phys. Ed. 75 A or 77.... | 1(0-3) |
| Music* | |

SECOND SEMESTER

| | |
|--------------------------------|--------|
| Food Problems II | |
| Food and Nut. 58..... | 4(2-4) |
| Home Management | |
| Hshld. Econ. 63..... | 3(2-2) |
| El. Household Chemistry | |
| Chem. 52 | 4(3-2) |
| English IV | |
| Engl. 64 | 4(4-0) |
| Civics | |
| Hist. 63 | 4(4-0) |
| Physical Training W-II or W-IV | |
| Phys. Ed. 76 or 78.... | 1(0-3) |
| Music* | |

THIRD YEAR

FIRST SEMESTER

| | |
|--------------------------------|--------|
| Home Sanitation | |
| Hshld. Econ. 64..... | 3(2-2) |
| Dressmaking and Millinery | |
| Clo. and Text. 60..... | 3(0-6) |
| Physiology and Hygiene | |
| Anat. 51 | 4(4-0) |
| English V | |
| Engl. 71 | 3(3-0) |
| Ancient History I† | |
| Hist. 51 | 4(4-0) |
| Physical Training W-I or W-III | |
| Phys. Ed. 75 A or 77.... | 1(0-3) |
| Music* | |
| Elective: | |
| Physics H-I | |
| Physics 61 | 4(3-2) |
| Elements of Poultry Keeping | |
| Poult. Husb. 52..... | 2(2-0) |

SECOND SEMESTER

| | |
|--------------------------------|--------|
| House Planning and Furnishing | |
| Ap. Art 56..... | 4(1-6) |
| Child Care and Home Nursing | |
| Hshld. Econ. 65..... | 3(2-2) |
| Elementary Bacteriology | |
| Bact. 52 | 3(2-2) |
| English VI | |
| Engl. 74 | 4(4-0) |
| Ancient History II† | |
| Hist. 52 | 4(4-0) |
| Physical Training W-II or W-IV | |
| Phys. Ed. 76 or 78.... | 1(0-3) |
| Music* | |
| Elective: | |
| Physics H-II | |
| Physics 62 | 4(3-2) |

* Elective.

† American Nation I and II or Modern History I and II may be substituted for the corresponding terms of Ancient History.

Agricultural Courses

AGRICULTURAL ECONOMICS

51. **ELEMENTARY FARM MANAGEMENT.** Third year, first semester. Class work, two hours; laboratory, two hours. Three semester credits. Prerequisites: Farm Crops, Soils and Fertilizers, and Live-stock Production. Assistant Professor Davidson.

56. **ELEMENTARY AGRICULTURAL ECONOMICS.** Third year, second semester. Class work, three hours. Three semester credits. Prerequisites: Agron. 51 and 56; An. Husb. 55.

The course presents the more important principles pertaining to the business side of farming. Farm organization, the characteristics of the factors of production and the intensity culture are followed by a study of farm tenancy, the forces determining the value of agricultural products, and the problems of marketing. Finally profits of farmers in relation to their efficiency and their ability to purchase land are discussed. The course is conducted by lectures, texts, and supplementary reading. Texts: Taylor's *Agricultural Economics*; and Ely and Wicker's *Elementary Principles of Economics*.

AGRONOMY

51. **FARM CROPS.** Second year, first semester. Class work, four hours; laboratory, two hours. Five semester credits. Prerequisite: Elementary Botany. Assistant Professor Davidson.

The course involves a study of both grain and forage crops, approximately one-half semester being given to each. Emphasis is placed upon the economic production of those crops which are of greatest importance in Kansas. The laboratory work is planned to acquaint the student with the different grain and forage plants and their habits of growing. Text: Wilson and Warburton's *Field Crops*.

56. **SOILS AND FERTILIZERS.** Second year, second semester. Class work, two hours; laboratory, two hours. Three semester credits. Prerequisites: Elementary Chemistry; Farm Crops. Assistant Professor Davidson.

The course involves a study of the physical nature of soils and their adaptation to crops, together with proper methods of handling to maintain good physical condition, to conserve moisture and to prevent washing and blowing. Means of maintaining the fertility of the soil, the care and use of barnyard manure; green manure and commercial fertilizers are also considered. In the laboratory and on field trips different soils are studied with reference to their physical properties and their relation to crops and methods of management. Text: Whitson and Walster's *Soils and Fertilizers*.

58. **WEED CONTROL AND SEED IDENTIFICATION.** Third year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Farm Crops. Mrs. Harling.

This course deals with the control and eradication of weeds; the identification of weed plants and seeds; and germination and purity testing. Field trips are made, and the assembling of a herbarium of the common farm weeds is required.

ANIMAL HUSBANDRY

51. **STOCK JUDGING I.** First year, first semester. Laboratory, six hours. Three semester credits.

This course consists in score-card practice in judging horses, beef cattle, dairy cattle, sheep, and swine. By means of this practice the students become familiar with the general points to be observed in judg-

ing market types and classes of live stock. One-fourth of this time is given to the study of dairy cattle, which instruction is given in the Department of Dairy Husbandry. Text: *Craig's Judging Live Stock*.

52. STOCK JUDGING II. First year, second semester. Laboratory, six hours. Three semester credits.

This course consists of a study of the breeding types and classes of horses, cattle, sheep, and swine, with practice in scoring and judging breeding animals.

53. BREEDS AND BREEDING. First year, second semester. Class work, two hours. Two semester credits. Prerequisite: Stock Judging I.

This course consists of a study of pure-bred horses, cattle, sheep, and swine, and the methods practiced by the best breeders. It also embraces the study of the general principles of breeding, such as variation and heredity. Text: *Mumford's Breeding of Farm Animals*.

54. FEEDS AND FEEDING. Second year, first semester. Class work, two hours. Two semester credits.

This course consists of a comparative study of the various feeds as to their usefulness and their relation to successful and economical feeding of live stock. It involves a study of the digestive system and the processes of nutrition, and a study of the origin, nature, grades, and value of the various by-products that are used in feeding operations. Text: *Henry and Morrison's Feeds and Feeding*, abridged edition.

55. LIVE-STOCK PRODUCTION. Second year, second semester. Class work, three hours. Three semester credits. Prerequisites: Stock Judging I and II.

This course involves a study of successful and economical methods of growing and finishing cattle, sheep, and hogs for market purposes, as well as the breeding of both market and pure-bred animals. Lectures, supplemented by agricultural newspaper work and Experiment Station records.

DAIRY HUSBANDRY

61. DAIRYING. Second year, first semester. Lecture, one hour; laboratory, two hours. Two semester credits. Mr. Atkeson.

This course includes lectures on the various breeds of dairy cattle, milk and its composition, Babcock testing, separation, and churning. Two individual lectures are given to the agricultural students on feeding the dairy herd, and two additional lectures on cheese making to the home-economics students.

Laboratory.—The laboratory work comprises the operation of the Babcock test, separating milk, churning, and soft-cheese making.

62. STOCK JUDGING. (An. Husb. 51.) Assistant Professor Cave.

Four weeks are given over to the judging of dairy cattle. The rest of the course is devoted to the study of the breeding and market types of horses, cattle, sheep, and swine, and is presented by the Department of Animal Husbandry.

63. ELEMENTARY DAIRY JUDGING. Second year, first semester. Laboratory, three hours. One semester credit. This course cannot be taken without Dairying (course 61). Assistant Professor Cave and Mr. Atkeson.

This course calls for the judging of dairy stock from the standpoint of economical production and breed type. Score cards are used for the purpose of training the student to become accurate, thorough, and systematic in the selection of animals as representative of breeds or for breeding purposes. No textbook is required. *Types and Breeds of Farm Animals*, by C. S. Plumb, and *Breeders' Association Literature* are used for reference.

HORTICULTURE

51. **FRUIT GROWING.** First year, second semester. Class work, two hours; laboratory, two hours. Three semester credits. Mr. Pickett.

This course includes a study of the principles of vegetable gardening and fruit growing. The first half of the semester is given to the problems of general fruit growing, and the vegetable gardening comprises practice in garden making and lectures during the last half of the semester.

56. **GARDENING.** First year, second semester. Class work, one hour; laboratory, two hours. Two semester credits. Mr. Pratt.

The practices and principles involved in the cultivation and care of home and market gardens are here studied.

MILLING INDUSTRY

52. **ELEMENTARY GRAIN MARKETING.** Third year, first semester. Class work, two hours; laboratory, two hours. Three semester credits. Professor Fitz.

This course includes the study of methods of handling and storing grain, together with the marketing of surplus grain from the farm. It involves study of the method of selling or buying, shipping and grading grain; organization of grain-inspection departments, with their merits and defects; the principal grain markets, with receipts and shipments of grain. The laboratory work consists of practice in sampling bulk grain and in examining and grading different kinds and types of such grain. A brief study is also made of the by-products resulting from the manufacture of food products, and their comparative costs.

POULTRY HUSBANDRY

51. **BEGINNING POULTRY.** First year, first semester. Recitation, one hour; laboratory, two hours. Two semester credits. Mr. Fox.

This course takes up a discussion of the various operations that go to make up the art of poultry keeping.

Laboratory.—The laboratory study includes work in dressing, packing, and caponizing.

52. **ELEMENTS OF POULTRY KEEPING.** Third year, first semester. Recitation, two hours. Two semester credits. Professor Lippincott and Mr. Fox.

This course covers the same ground as Beginning Poultry, except that no laboratory work is required.

55. **INCUBATION PRACTICE.** Third year, second semester. Three times a day, seven days a week, for a period of not less than four weeks, at hours outside the regular schedule. One semester credit. Prerequisite: Beginning Poultry.

This course consists of the care of an incubator by the student through the incubation period, testing the eggs, and bringing off the hatch. Careful records of fertility, cost of incubation, and varying temperature, moisture, and ventilation conditions are kept. One successful hatch must be brought off in either a hot-air or hot-water incubator.

58. **BROODING PRACTICE.** Third year, second semester. Three times a day, seven times a week, for a period of not less than four weeks, at hours outside the regular schedule. One semester credit. Prerequisite: Beginning Poultry. To be preceded or accompanied by Incubation Practice.

In this course each student handles a flock of chicks. He has the entire care of brooding and feeding them during the most critical weeks. A record of the cost of fuel and feed, of gains in weight, and of mortality is required. A group of at least fifty chicks must be successfully brooded for at least four weeks in any of the several types of brooders.

Veterinary Medicine and Physiology Courses

ANATOMY AND PHYSIOLOGY

51. PHYSIOLOGY AND HYGIENE. Third year, second semester. Class work, four hours. Four semester credits. Doctor Vawter.

Sufficient consideration is given to the anatomy or structure of the body to enable the student to understand more fully the functions of the proper parts. The normal functions of the various organs of the body are studied. The importance of the normal functioning of the body for the prevention of diseases, and also diseases that may arise from improper performance of the various organs, are discussed. Text: Conn and Buddington's *Advanced Physiology and Hygiene*.

SURGERY AND MEDICINE

51. DISEASES OF FARM ANIMALS. Third year, second semester. Class work, two hours. Two semester credits.

This course is intended to teach the student the recognition of disease, the principles involved in the preservation of health, and the application of first aid in disease or accident of farm animals. The various diseases resulting from the use of spoiled foods, or the improper or injudicious use of good foods, are discussed. The value of food, care, and the nursing of the sick animal is thoroughly impressed upon the student. The common infectious diseases and the means of their prevention and eradication are considered. Text: Craig's *Common Diseases of Farm Animals*.

General Science Courses

BACTERIOLOGY

52. ELEMENTARY BACTERIOLOGY. Third year, second semester. Lectures, two hours; laboratory, two hours. Three semester credits. Prerequisite: Chemistry, one year. Professor Bushnell.

This is an elementary course in the principles of bacteriology. Bacteriological problems are considered from an entirely practical standpoint. The course is offered in order to give the student a reading knowledge of the sources and modes of infection; the relation of bacteriology to dairying and to soils and crop production; general sanitation; fermentations, etc. It includes a discussion of microorganisms as related to air, water, and foods.

Laboratory—Various microscopic forms of importance in fermentation; preservation and spoilage of foods; the influence of various preservatives upon microorganisms common in the home; methods of sterilization and of pasteurization; the handling of infectious material; normal and abnormal fermentations of milk and milk products; quantitative study of bacteria in the soil; a limited study of pathogenic bacteria, of sewage pollution of water, etc., comprise the laboratory work.

BOTANY

51. ELEMENTARY BOTANY. First year, both semesters. Class work, two hours; laboratory, two hours. Three semester credits.

This course involves an elementary study of the biology of plants, including the simpler facts of their structure and of their physiology. The life history of a seed plant is followed from the germination of the seed to maturity; and the structure and work of the root, stem, and leaf system are studied in some detail. The biology of the flower and its peculiar

adaptations to insect or wind pollination are emphasized, as well as the manner in which seeds and fruits are distributed. Throughout the course emphasis is laid on the relations of plants to light, air, water, and soil, and on the relation of the biology of the plants to agricultural practice.

52. GENERAL SCIENCE. First year, first semester. Recitation, two hours; laboratory, four hours. Four semester credits.

This course deals with problems of elementary science as related to home-economics work. The major part of the work is a study of plants such as molds, bacteria, plant tissues, and the storage of foods in plants. Some time is given to a study of physical and chemical problems of an elementary nature. The problems studied are chosen because of their relation to the work of the household.

CHEMISTRY

51. ELEMENTARY CHEMISTRY. Second year, first semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Mr. Keith.

The work this term is an elementary study of the general principles of chemistry, using the elements oxygen, hydrogen, nitrogen, chlorine, and carbon, and their most important compounds, as its basis. Sulphur and phosphorus, and to a slight extent other nonmetals, are studied, and following this a study of the metals and their most important compounds is begun. So far as possible, illustrations are drawn from practical life on the farm and in the home. The laboratory work is designed to give the student some knowledge of the essential features of chemical change, as well as to familiarize him with some of the more important elements and chemical compounds. Textbook: McPherson and Henderson's *First Course in Chemistry*.

52. ELEMENTARY HOUSEHOLD CHEMISTRY. Second year, second semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Prerequisite: Elementary Chemistry. Mr. Keith.

In the work of this term the study of the metals is completed, and chemistry is then studied in its more direct application to the household. The course includes not only some special applications of inorganic chemistry, but simple organic chemistry, especially in its relation to foods. The laboratory work is an application of chemistry to various household problems touching water, foods, textiles, and utensils. Textbook: Snyder's *Chemistry of Plant and Animal Life*.

53. ELEMENTARY AGRICULTURAL CHEMISTRY. Second year, second semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Prerequisite: Elementary Chemistry. Mr. Keith.

The study of the metals, begun the previous semester, is first completed. The chemical composition and chemistry of the growth of plants and animals are then taken up, and the general principles of chemistry are presented as applicable on the farm in relation to soils, fertilizers, dairy products, feeds, water, etc. The laboratory work follows these lines and is made as practical as possible. Textbook: Snyder's *Chemistry of Plant and Animal Life*.

ECONOMICS

51. ECONOMICS. Second or third year, both semesters. Class work, three hours. Three semester credits. Associate Professor Merritt.

This course is a study of fundamental principles underlying man's wealth-getting and wealth-using activities, and their application to conditions and problems of the industries of to-day. Instruction is based on a text, assigned readings, and reports.

ENGLISH

51. ENGLISH I. First year, first semester. Class work, four hours. Four semester credits. Assistant Professor Rice and Miss Leonard.

This course has a twofold purpose: to develop in the student the ability to interpret readily from the printed page, and to give instruction in the elementary principles of composition. For the first aim, short selections from the readers are used, with readings from textbooks, biographies, current periodicals, and works of a vocational nature. In connection with the text, practice work in letter writing and business forms is emphasized. Texts: Searson and Martin, *Studies*, Advanced Course; Hanson, *Two Years' Course in English Composition*.

54. ENGLISH II. First year, second semester. Class work, four hours. Four semester credits. Miss Leonard.

This course is a continuation of English I. It includes a review of grammar, practice in the use of the dictionary, and a thorough study of the paragraph. Oral composition is required. Emphasis is placed on the writing of themes on topics of keenest interest to the student. Text: Hanson, *Two Years' Course in English Composition*, chapters IX-XIII, inclusive.

61. ENGLISH III. Second year, first semester. Class work, four hours. Four semester credits. Assistant Professor Rice and Miss Russel.

The work of this course consists of a study of American literature. Class readings, class discussions, written sketches, abstracts, and outlines are required. The aim of the course is to familiarize the student with the masterpieces of his own countrymen, and to offer continued study in the cultural as well as the practical side of literature and language. Text: Cairns, *American Literature for Secondary Schools*, to page 147.

64. ENGLISH IV. Second year, second semester. Class work, four hours. Four credits. Miss Leonard and Miss Russel.

This course is a continuation of the work in English III, completing the work of the text. Selections from the works of Poe, Webster, Lincoln, Longfellow, Whittier, Emerson, Lowell, Holmes and others are chosen for study, and some written work is required. Text: Cairns, *American Literature for Secondary Schools*, page 147 to end.

71. ENGLISH V. Third year, first semester. Class work, three hours. Three semester credits. Miss Leonard and Miss Russel.

This is a course in advanced composition. It includes instruction in the four forms of discourse, practice in the preparation of original themes, oral English, elementary debating, and a continuation of first-year work in commercial usage. Texts: Hanson, *Two Years' Course in English Composition*, Part III; Davis and Lingham, *Business English and Correspondence*.

74. ENGLISH VI. Third year, second semester. Class work, four hours. Four semester credits. Assistant Professor Rice and Miss Leonard.

This is a course in English classics. It includes an intensive study of representative classics. Abstracts, outlines, paraphrases, and original themes are required. Texts: Selections from the works of Shakespeare, Scott, Burns, Tennyson, and others.

ENTOMOLOGY

51. HOUSEHOLD INSECTS. Second year, first semester. Class work, two hours. Two semester credits. Professor Dean.

This course consists of illustrated lectures and reference reading on the habits, life history, and general methods of control of the principal insects injurious to house, garden, lawn, and human health.

61. FARM INSECTS. First year, second semester. Class work, two hours; laboratory, two hours. Three semester credits. Associate Entomologist McColloch.

This is a study of the elementary anatomy, structure, and physiology of insects, complete enough to give clear understanding of the general structure of insects and the underlying facts upon which the scientific application of remedial or preventive measures is based. All of the more important insects of the farm, garden, and orchard are discussed at sufficient length to give a clear idea of their life histories and habits, together with the best means of control. The class work consists of lectures and text.

Laboratory.—The laboratory work is designed to acquaint the student with the more common injurious insects found on the farm. The preparation and use of various sprays, poisons, baits, and fumigants are also taken up.

65. ELEMENTARY BEEKEEPING. Third year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Farm Insects.

This course comprises a general study of the structure, life history, general behavior, activities, and products of the honeybee. Special attention is given to practical beekeeping. A study is made of bee diseases and of the standard methods to be used in their eradication and control.

HISTORY

51, 52. ANCIENT HISTORY I AND II. Third year, first and second semesters, respectively. Class work, four hours. Four semester credits for each course. Miss Orem.

The history of civilization in the Nile and the Tigris-Euphrates valleys serves as an introduction to the more serious work of this course, in which the emphasis is placed upon the history of Greece and Rome and western Europe down to 800 A. D. In addition to the greater political events characterizing the history of these regions, special attention is given to the institutional life of this period, to the social, economic, and intellectual forces at work in the different states, as well as to their governmental organization. Text: Westermann's *The Story of the Ancient Nations*.

55, 56. MODERN HISTORY I AND II. Third year, first and second semesters, respectively. Class work, four hours. Four semester credits for each course. Miss Orem.

Beginning with 800 A. D., a general survey is made of the development of Europe down to the present time and conditions. The more important events of the eleven centuries comprising this period are treated in as full detail as time will permit. The social, economic, cultural, religious, and diplomatic phases are emphasized. In view of the fact that greater changes have taken place in Europe since 1789 than in the thousand years preceding, special attention is given to the social and economic developments of this period and to the political developments and international relations, especially the changes which have prepared the way for the present European situation. Text: Harding's *New Medieval and Modern History*.

59, 60. AMERICAN NATION I AND II. Third year, first and second semesters, respectively. Class work, four hours. Four semester credits for each course. Assistant Professor James and Miss Orem.

This course consists of a survey of American history from the discovery of America to the present time. It deals with the establishment of the English colonies in America; the growth of social and political institutions in these colonies; the development of an American nationality; the struggle among European nations for the possession of North America; the causes and meaning of the American Revolution; the formation

and establishment of the constitution; the rise of the West and its influence, socially, politically, and economically; the growth of sectionalism, the secession movement and the struggle to preserve the Union; and the important events characterizing American history since the termination of the contest between the North and the South. Along with the political history of the United States, a study of its economic development is made for the purpose of understanding the steps by which America, from humble beginnings in the colonial period, has reached its present high position as an industrial state. Texts: West's *History of the American People*, and Bogart's *The Economic History of the United States*.

63. CIVICS. Second and third years, both semesters. Class work, four hours. Four semester credits. Assistant Professor James and Miss Orem.

This is not a course of the old type, usually called civil government, nor a course in constitutional law, but a vigorous course in the actual workings of our present-day governmental and political activities. Text: Guitteau's *Government and Politics in the United States*, Kansas edition.

INDUSTRIAL JOURNALISM AND PRINTING

51. FARM WRITING. Third year, second semester. Class work, two hours; laboratory, four hours. Four semester credits. Miss Polson.

The course treats of the elementary principles of writing for newspapers and farm publications, on such subjects as the students are likely to encounter in practical life. The student is shown how to obtain effective publicity for worthy enterprises in which he may be engaged. Emphasis is laid on agriculture, rural life, and general community service.

MATHEMATICS

51. INDUSTRIAL ARITHMETIC A. First year, first semester. Class work, four hours. Four semester credits. Assistant Professor Fehn.

The course has two distinct aims: (1) A practical knowledge of the principles of numbers, both integral and fractional; and (2) the application of these principles to practical problems of the farm and the shop. A large number of problems arising from actual experience over the whole field of agricultural science are made the basis of the problem work. Farm investments, farm accounts, and farm values receive special attention. Text: Stratton and Remick's *Agricultural Arithmetic*.

52. INDUSTRIAL ARITHMETIC W. First year, first semester. Class work, four hours. Four semester credits. Miss Holroyd and Miss McKittrick.

This course follows the lines of Industrial Arithmetic A, except that the points of emphasis are varied so as to meet the needs of young women. Text: Same as for the course above.

63. ALGEBRA I. First year, both semesters. Class work, four hours. Four semester credits. Miss Holroyd and Miss McKittrick.

This course includes a study of simple algebraic expressions and the use of the equation; a treatment of the methods of finding distances by means of scale drawings, similar triangles, and elementary trigonometric functions; a discussion of the various uses of graphs and of positive and negative numbers. Text: Rugg and Clark's *Fundamentals of High-school Mathematics*.

64. ALGEBRA II. First and second years, both semesters. Class work, four hours. Four semester credits. Prerequisite: Algebra I. Miss Holroyd and Miss McKittrick.

The chief topics considered are solution of simultaneous equations, both graphically and algebraically, factoring, fractions and fractional equations, square roots, radicals, and an introduction to quadratic equations. Text: Rugg and Clark's *Fundamentals of High-school Mathematics*.

66. PLANE GEOMETRY I. Second and third years, first semester. Class work, four hours. Four semester credits. Prerequisite: Algebra II. Miss Holroyd.

Books I and II of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course.

67. PLANE GEOMETRY II. Second and third years, second semester. Class work, four hours. Four semester credits. Prerequisite: Plane Geometry I. Assistant Professor Fehn.

Books III, IV, and V of Wentworth and Smith's *Plane and Solid Geometry* are included in this course.

71. SOLID GEOMETRY. Third year, first semester. Class work, four hours. Four semester credits. Prerequisite: Plane Geometry II. Assistant Professor Fehn and Miss Holroyd.

Books VI, VII, and VIII of Wentworth and Smith's *Plane and Solid Geometry* form the subject matter of this course.

72. ALGEBRA III. Third year, second semester. Class work, four hours. Four semester credits. Prerequisite: Algebra II. Assistant Professor Fehn and Miss Holroyd.

This course includes, besides a rapid review of factoring, fractions, linear equations, roots, radicals, and exponents, a treatment of quadratic forms with graphical work and theory, ratio and proportion, variation, the progressions, and the binomial theorem for positive integral exponents. Text: Hawkes, Luby and Touton's *Second Course in Algebra*.

MILITARY TRAINING

All young men are required to take military training during their second year of attendance in the School of Agriculture. Their work in this branch is identical, so far as it goes, as that of the men in the College corps of cadets. The following work is taken:

101. MILITARY SCIENCE I. Lectures, recitations, and military drill, four hours a week. One semester credit.

The work of this course is divided as follows:

(a) *Practical*. Physical drill; infantry drill; school of the soldier, squad, and company in close and extended order; preliminary instruction, sighting, position, and aiming drills, gallery practice, nomenclature, and care of rifle and equipment.

(b) *Theoretical*. Theory of target practice; individual and collective; military organization; map reading; service of security; personal hygiene.

102. MILITARY SCIENCE II. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: Military Science I.

The work of this course is divided as follows:

(a) *Practical*. Physical drill; infantry drill; school of the battalion; ceremonies; manuals; bayonet combat; entrenchment; first-aid instruction; range and gallery practice.

(b) *Theoretical*. Lectures on military policy as shown by military history of the United States, and military obligation of citizenship; service of information; combat; Infantry Drill Regulations, to include the school of the company; camp sanitation for small commands.

MUSIC

Music is offered as an elective for both young women and young men. Instruction is furnished free to all regular students assigned to music classes, but for individual instruction a fee is charged. Further particulars are given in the article on "Music," elsewhere in this catalogue.

PHYSICAL EDUCATION

MEN'S DEPARTMENT

51A. PHYSICAL TRAINING M-I. First semester. Three hours. One semester credit. Required of all young men during their first semester in the school.

The course includes elementary free-hand calisthenics; elementary light hand apparatus, including wands, dumb-bells, etc.; elementary heavy apparatus work, and games. All work is graded in progressive order for each semester. Swimming is taught in the spring. A physical examination is made of each student when he enters. During the fall rugby football and soccer football are given. From the first of December to the end of the semester the work is in the gymnasium. Elementary calisthenics and Swedish movements, elementary apparatus, and games are taught.

Hygiene and social problems are discussed. This instruction gives an insight into the practical problems of daily healthful living from a personal point of view. Directions are given for avoiding the common ills of student life, and for maintaining the highest physical and mental condition while in the school, as well as for gaining the highest development of vital power and health for future duties.

52. PHYSICAL TRAINING M-II. Second semester. Three hours. One semester credit. Required of all young men during their second semester in the school.

This course is a continuation of Physical Training M-I. In the spring, as soon as weather conditions allow, the work consists of baseball and track and field athletics.

WOMEN'S DEPARTMENT

75A, 76. PHYSICAL TRAINING W-I AND W-II. First and second semesters, respectively. Three hours. One semester credit for each course. Miss Bond and Dean Van Zile.

This is an introductory course. It includes corrective exercises, light apparatus work, folk dancing, games, and swimming. A physical examination is made of each young woman before she enters upon the work.

Instruction in hygiene and social problems is an essential part of course 75A. In these lectures, which are given by Mary P. Van Zile, Dean of Women, in addition to the problems of hygiene as applied to individual health, the biological truths that lead to serious, respectful consideration of social and sex hygiene are presented.

77, 78. PHYSICAL TRAINING W-III AND W-IV. First and second semesters, respectively. Three hours. One semester credit for each course. Miss Bond.

These courses are a continuation of Physical Training W-I and W-II. Esthetic dancing, Swedish gymnastics, games, and swimming are taught in these courses.

PHYSICS

51. PHYSICS A-I. Second or third year, first semester. Class work, three hours; laboratory, two hours. Four semester credits. Assistant Professors Stewart and Smith.

The fundamental laws of mechanics, heat and sound are presented in this course. The application of principles to the common things of everyday life is emphasized. The laboratory work is based upon the work done in class, and is outlined in such a manner as to give the students special drill in exact measurements. Text: Black and Davis's *Practical Physics*.

52. PHYSICS A-II. Second or third year, second semester. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Physics A-I. Assistant Professors Stewart and Smith.

This course is a continuation of Physics A-I. The subjects of magnetism, electricity, and light are considered. An introductory study is made of the units used in measuring electrical energy, the principles involved in current distribution, the uses now being made of electricity, the ordinary phenomena of light, and questions of modern illumination. Text: Black and Davis's *Practical Physics*.

61. PHYSICS H-I. Third year, first semester. Class work, three hours; laboratory, two hours. Four semester credits. Professor Hamilton.

The work given in this course has a direct bearing on the principles of mechanics, sound and heat as they apply to the home. The laboratory work is especially adapted to this phase of the work. Text: Tower, Smith and Turton's *Physics*.

62. PHYSICS H-II. Third year, second semester. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Physics H-I. Professor Hamilton.

This course is a continuation of Physics H-I. The fundamental principles and laws of electricity and light are presented in this course, with special applications of the use of electricity in the home. Laboratory work is based on the study of simple electrical appliances used in the home. Text: Tower, Smith and Turton's *Physics*.

ZOOLOGY

51. ELEMENTARY ZOÖLOGY. Second year, second semester. Class work, one hour; laboratory, four hours. Three semester credits.

This course deals with the natural history of animals. The two hours of class work are devoted to résumés of the field and laboratory work and to general matters of animal biology. The laboratory work consists of one three-hour period a week. This work is carried on for the most part out of doors. Ponds and streams, meadows and woodlands are visited and animals are studied in their relation to each other and to their environments. Numbers of animals are brought to the laboratory, where they are kept in vivaria, and such study is given them as is not possible out in the field.

Mechanic Arts Courses

ARCHITECTURE AND DRAWING

51. FREE-HAND AND OBJECT DRAWING. First year, first semester. Laboratory, six hours. Three semester credits. Mr. ———.

The work of this course includes exercises in drawing simple figures illustrating the effects of geometrical arrangement and the laws of design; the principles of perspective are studied and illustrated by drawing from geometric solids and simple objects. Practice is given in free-hand lettering and in sketching objects of the shops and out-of-doors.

APPLIED MECHANICS

51. CONCRETE CONSTRUCTION I RECITATION. First year, both semesters. Lectures and recitations, one hour. One semester credit. Mr. Robert.

Instruction is given in the principles governing the selection and preparation of materials, the proper proportioning of materials for different conditions, the construction of forms, mixing and handling concrete, elementary reinforced concrete construction, finishing concrete surfaces, stucco and plaster work, and waterproofing and coloring concrete. A brief study is made of the application of these principles to the making

of concrete foundations, building blocks and bricks, posts, sidewalks, floors, tanks, cisterns, silos, bridges, and culverts. Text: Seaton's *Concrete Construction for Rural Communities*.

55. CONCRETE CONSTRUCTION I LABORATORY. First year, both semesters. Laboratory work, two hours. One semester credit. Must accompany or follow Concrete Construction I Recitation (Ap. Mech. 51). Mr. Robert and Mr. Budden.

Laboratory and field work is given in hand and machine mixing and handling of concrete, and in the construction of forms for such objects as machine and building foundations, floors, sidewalks, fence posts, and building blocks. Tests are made on concrete cylinders and beams to illustrate the effect of different methods of treatment on the strength and reliability of plain and reinforced concrete.

60. CONCRETE CONSTRUCTION II. Second year, first semester. Laboratory, six hours. Three semester credits. Prerequisite: Concrete Construction I Laboratory (Ap. Mech. 55). Mr. Robert.

Field work is given in practical plain and reinforced concrete construction, with lectures on field methods of bending steel, of placing it and securing it in place, and of mixing and placing concrete, with special reference to building and bridge construction. Simple laboratory tests of steel, of concrete and of reinforced concrete beams are also included.

65. CONCRETE CONSTRUCTION III. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Concrete Construction II (Ap. Mech. 60). Mr. Robert.

This course includes standard tests for fineness, specific gravity, soundness, and strength of cement, for voids, uniformity coefficient, and cleanness of sand and stone, and for the effect of variation of these factors on the strength of mortars and concretes.

70. STRENGTH OF MATERIALS. Second year, second semester. Class work, three hours. Three semester credits. Prerequisite: Concrete Construction I Recitation (Ap. Mech. 51). Mr. Robert.

The course embraces an elementary study of the strength of beams, columns, and other structural and machine elements, of wood, steel concrete, and other materials. Text: Merriman's *Strength of Materials*.

72. GEOMETRICAL DRAWING. First year, second semester. Drafting-room practice, six hours. Three semester credits. Mr. Smutz.

This course comprises free-hand lettering, the use of drawing board, T-square and instruments, geometrical constructions, and orthographic projections and sections of simple objects. Accuracy is emphasized. Text: French and Svensen's *Mechanical Drawing for High Schools*.

75. SHOP DRAWING I LECTURE. Second year, first semester. Lectures and recitations, one hour. One semester credit. Prerequisite: Geometrical Drawing. Geometry I (Math. 66) must accompany or precede this course. Mr. Durland.

A study is made of orthographic, cabinet, and isometric projections, revolutions, the development of surfaces and sheet-metal drafting. Text: French and Svensen's *Mechanical Drawing for High Schools*.

80. SHOP DRAWING I LABORATORY. Second year, first semester. Drafting-room practice, four hours. Two semester credits. Must accompany the lecture (Ap. Mech. 75). Mr. Durland.

Practice is given in lettering, in the construction of orthographic, cabinet, and isometric projections of objects, revolutions, intersections and development of surfaces, sheet-metal drafting and the construction of paper models of sheet-metal problems.

85. SHOP DRAWING II LECTURE. Second year, second semester. Lectures and recitations, one hour. One semester credit. Prerequisite: Shop Drawing I (Ap. Mech. 75, 80). Mr. Durland.

A continuation of the preceding course, with the study of conventional methods of representation, working drawings, technical sketching, and methods of reproducing working drawings. Text: French and Sven-
sen's *Mechanical Drawing for High Schools*.

90. SHOP DRAWING II LABORATORY. Second year, second semester. Drafting-room practice, four hours. Two semester credits. Must accompany the lecture (Ap. Mech. 85). Mr. Durland.

Working drawings are made from plates during the first part of the semester. Later, free-hand sketches are made of simple machine parts, and working drawings are made from these sketches. Practice is given in making tracings and blue prints.

95. SHOP DRAWING III. Third year, second semester. Drafting-room practice, four hours. Two semester credits. Prerequisite: Shop Drawing II (Ap. Mech. 85, 90). Mr. Durland.

Practice is given in making working drawings from free-hand sketches of machine parts, assembly drawings, and in designing simple machine parts by empirical methods.

FARM ENGINEERING

51. ELEMENTARY FARM MACHINERY. Second year, first semester. Class work, one hour; laboratory, two hours. Two semester credits. Mr. Parsons.

In this course the student is taught the principles underlying the construction, operation, and adjustment of the different types of farm machinery. Instruction is also given in fencing, rope work, and belt splicing. Proper adjustment and operation of machines is taught in the laboratory and in the field.

66. ELEMENTARY TRACTION ENGINES I. First and second years, both semesters. Laboratory, four hours. Two semester credits. Prerequisite: Farm Gas Engines I (Farm Engr. 75). Assistant Professor Sanders and assistants.

A study is made of gas traction engines, including motors, frames, transmission systems, cooling systems, ignition systems, lubricating systems, and carburetors; operation, care, repair, and testing of gas traction engines.

69. ELEMENTARY TRACTION ENGINES II. Third year, both semesters. Laboratory, four hours. Two semester credits. Prerequisite: Elementary Traction Engines I (Farm Engr. 66). Assistant Professor Sanders and assistants.

Practice is given in the operation, care, and testing of various types of gasoline and kerosene traction engines, including belt tests, road tests, and field tests.

72. ELEMENTARY TRACTION ENGINES III. Third year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Elementary Traction Engines II (Farm Engr. 69). Assistant Professor Sanders and assistants.

This is a continuation of Elementary Traction Engines II, and includes special tests on gas traction engines.

75. FARM GAS ENGINES I. First year, both semesters. Class work, one hour; laboratory, two hours. Two semester credits. Assistant Professor Sanders and assistants.

A study is made of gasoline and kerosene engines; four-stroke and two-stroke cycle engines, gas-engine fuels, carburetors, ignition systems,

lubrication, governing; selection, erection, and operation of stationary gasoline and kerosene engines; fundamental parts of automobiles.

77. FARM GAS ENGINES II. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Farm Gas Engines I (Farm Engr. 75). Assistant Professor Sanders and assistants.

A detailed study is made of gas-engine operation and care, with special attention to ignition systems, carburetors, and testing. Automobile parts, including engines, differentials, transmissions, lubricating systems, clutches, systems of ignition, starters, and carburetors; tests of ignition equipment and carburetors are also studied.

80. FARM GAS ENGINES III. Third year, first semester. Laboratory, six hours. Three semester credits. Prerequisite: Farm Gas Engines II (Farm Engr. 77). Assistant Professor Sanders and assistants.

This course consists of the operation, repair, and testing of gas and oil engines.

82. FARM GAS ENGINES IV. Third year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Farm Gas Engines III (Farm Engr. 80). Assistant Professor Sanders and assistants.

This is a continuation of Gas Engines III, and includes special tests.

SHOP WORK

51. CARPENTRY I. First year, both semesters. Laboratory, four hours. Two semester credits. Mr. Parker and Mr. Aiman.

This is a course of exercises in constructive carpentry, which are so graded as to give the student the principles of general carpenter work, and training in the proper use of tools and in the reading of drawings and blue prints. Some work is given to bring out the principles of framing and building operations, and practice is given in the use of paints and varnishes as protective coverings for woodwork.

54. CARPENTRY II. Second year, both semesters. Laboratory, six hours. Three semester credits. Prerequisite: Carpentry I (Shop 51). Mr. Parker and Mr. Aiman.

This course includes exercises in turning cylinders, cones, beads, convex and concave turning, and exercises that will involve the use of all the different turning tools, and turning between centers, on the face-plate, and with hollow chucks. Some of the exercises are: tool handles, dumbbells, rolling-pins, napkin rings, table legs, porch posts, balusters, built-up and solid newel posts, columns, and rosettes.

57. CARPENTRY III. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Carpentry II (Shop 54). Mr. Parker and Mr. Aiman.

This course includes a combination of machine and hand work where the material is worked up on the machines and then fitted by hand. Some of the work consists of making plain and fancy casings, plate rails, picture molding, picture frames, and simple pieces of furniture, which are stained, varnished, or otherwise finished.

60. CARPENTRY IV. Third year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Carpentry III (Shop 57). Mr. Parker and Mr. Aiman.

This course consists of hand work with the rabbet, router, beading and matching planes, and with the dado, plow, and fillister in making window sashes and frames, doors and frames, grooved flooring, door jambs, and molding.

63. CARPENTRY V. Third year, second semester. Laboratory, supplemented by lectures, four hours. Two semester credits. Prerequisite: Carpentry IV (Shop 60). Mr. Parker and Mr. Aiman.

The fundamental factors to be taken into consideration in the construction of buildings, as selection of the building site, laying out and squaring the foundation, excavating, types of foundations, form building for concrete, anchoring, placing of the sills, joists, bridging and studding, and bracing, rafter cutting and fitting, are studied in this course. The laboratory work consists of exercises along the lines given above.

66. CARPENTRY H. First year, second semester. Laboratory, four hours. Two semester credits. For women only. Mr. Parker and Mr. Aiman.

A practical course in woodwork, in which the student makes simple articles, the making of which gives the proper training in the use of tools, and familiarity with the different kinds of woods, stains, varnishes, and paints. Supplementary lectures are given along with the laboratory work in order to bring out the different points more clearly.

69. BLACKSMITHING I. First year, first semester. Laboratory, four hours. Two semester credits. Mr. Lynch and Mr. Granell.

This is a very practical course in the forging operations, such as drawing, upsetting, welding, bending, twisting, and punching, together with instruction in the proper use and care of the fire and tools, and in handling the metals in the forge. Tools required: A two-foot rule, a pair of five-inch outside calipers, a center punch and a ball-pein hammer weighing, with handle, about two pounds.

72. BLACKSMITHING II. First year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Blacksmithing I (Shop 69). Mr. Lynch and Mr. Granell.

This work consists of the making of such tools as punches, chisels, drills, scrapers, hammers, and other tools that are used in the trade. Tools required: Same as for Blacksmithing I.

75. BLACKSMITHING III. Second year, first semester. Laboratory, supplemented by lectures, six hours. Three semester credits. Prerequisite: Blacksmithing II (Shop 72). Mr. Lynch and Mr. Granell.

A practical course in the various forging operations, with practice both as a blacksmith and helper, including the planning and laying out of work with special provisions for duplicate parts. Forging and forming tools are made as the nature of the work requires. Lectures are given so that the principles underlying the different operations may be thoroughly understood. Tools required: Same as for Blacksmithing I.

78. BLACKSMITHING IV. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Blacksmithing III (Shop 75). Mr. Lynch and Mr. Granell.

This course includes the theory of hardening, tempering, and annealing, case- and pack-hardening; a study of the nature of the different grades of carbon tool steel; tool forging, including the proper manipulation of the various lathe, planer, and shaper tools; forging and heat treating special and high-speed steels. Instruction is by lectures and demonstrations. Tools required: Same as for Blacksmithing I.

81. BLACKSMITHING V. Third year, first semester. Laboratory, six hours. Three semester credits. Prerequisite: Blacksmithing IV (Shop 78). Mr. Lynch and Mr. Granell.

General shop work is here given, in which emphasis is laid on the quantity as well as the quality of the work, the idea being to give the student a knowledge of the amount of time required to do certain work. The work is varied so that the knowledge acquired will be as complete as possible. Tools required: Same as for Blacksmithing I.

84. BLACKSMITHING VI. Third year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Blacksmithing V (Shop 81). Mr. Lynch and Mr. Granell.

This is a continuation of Blacksmithing V, with practice with the oxyacetylene and thermit processes of welding. Tools required: Same as for Blacksmithing I.

87. MACHINE SHOP I. Second year, first semester. Laboratory, six hours. Three semester credits. Mr. Jones and Mr. Bundy.

Practical machine work in the building and assembling of gas engines and wood lathes. Exercises are given to bring into use the various machines in the shops. Tools required: A four-inch scale or B. & S. slide caliper, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, and one B. & S. center gage.

90. MACHINE SHOP II. Third year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Machine Shop I (Shop 87). Mr. Jones and Mr. Bundy.

This course embraces practical work in making repairs on machinery, such as babbitting and fitting bearings, aligning shaftings and pulleys, lacing and fitting belts, and general repair work on engines and other machinery.

93. MACHINE SHOP III. Third year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Machine Shop II (Shop 90). Mr. Jones and Mr. Bundy.

A continuation of the preceding term's work, with work on the milling machines and universal grinder.

96. MOLDING I. First year, second semester. Laboratory, four hours. Two semester credits. Mr. Grant.

This course consists of floor and bench molding with a great variety of patterns, along with which the student gets experience with different kinds of sand, and facings; also, open sand work, sweep molding, machine molding, core making, setting of cores, gates, and risers, and different methods of venting.

Home Economics Courses

APPLIED ART

51. ELEMENTARY DESIGN. First year, second semester. Laboratory, six hours. Three semester credits.

The principles underlying pleasing color combinations, fine proportions, and consistent arrangement of parts are studied. Many exercises are given in selecting from objects of clothing and house furnishings those involving color harmonies, consistent shapes, and orderly arrangement. Original problems are given in the application of these principles.

56. HOUSE PLANNING AND FURNISHING. Third year, second semester. Class work, one hour; laboratory, six hours. Four semester credits. Prerequisite: Elementary Design.

Planning of a house, also each room, with regard to convenience and comfort. An adaptation is made to location and needs of the family, sanitation, modern conveniences, etc. Principles of color, form and arrangement are studied in application to all problems involved in home decoration, such as window, door and wall spacings, woodwork, wall coverings and floor coverings; appropriate furniture, and the arrangement of these in different rooms.

CLOTHING AND TEXTILES

57. **GARMENT MAKING I.** First year, first semester. Recitation, one hour; laboratory, four hours. Three semester credits.

In this course and the following, practice is given in the fundamental stitches and in the use of the sewing machine and of commercial patterns in the making of undergarments. A study is made of the characteristics of cotton fiber and cotton goods suitable for underwear, and practice is given in identifying the various kinds and qualities of cotton goods on the market. In the selection of the material, trimming and style of the garments which are made, attention is given to cost, durability, laundering qualities, and hygiene. An itemized account is kept of the time and money used in making each garment, and comparisons are made with ready-to-wear garments.

58. **GARMENT MAKING II.** First year, second semester. Recitation, one hour; laboratory, four hours. Three semester credits.

This course is a continuation of Garment Making I, in which the laboratory work consists in the making of cotton garments of more difficult construction.

59. **CLOTHING PROBLEMS AND DESIGN.** Second year, first semester. Recitation, two hours; laboratory, four hours. Four semester credits.

This course deals with the planning, selecting, making and care of clothing for the different members of the family. Clothing design is studied with a view to its usefulness in selecting styles, colors and materials of ready-made clothing, as well as in planning garments from the standpoints of cost, health, suitability and style; each girl plans her own clothing budget and keeps account of her clothing expenditures. The clothing needs of the other members of the family are considered, with special attention to infants and children, and budgets are worked out for actual families. The advantages and disadvantages of ready-made clothing, and the problems which arise in its purchase, are considered. The selection and care of household linens are studied.

In the laboratory work, children's clothing is made and practice is given in mending, renovating, and remodeling worn clothing.

60. **DRESSMAKING AND MILLINERY.** Third year, first semester. Laboratory, six hours. Three semester credits.

Through work in the laboratory the problems connected with the construction of silk and wool dresses and of millinery are studied, each girl completing at least one wool or silk dress and one hat. The choice of materials, trimming and style appropriate to each individual is considered. Practice may be obtained in simple embroidery and other hand-work used in trimming dresses or hats.

FOOD ECONOMICS AND NUTRITION

55. **ELEMENTARY FOOD STUDY I.** First year, first semester. Recitation, one hour; laboratory, four hours. Three semester credits.

The recitations in this course and in Cooking II are spent in a brief study of the source, composition, production and marketing of the various foods studied in the laboratory. The laboratory work includes practice in cooking fruits, vegetables, cereals and starchy products, simple desserts, candies, and the use of fats in frying and in salad dressings.

56. **ELEMENTARY FOOD STUDY II.** First year, second semester. Recitation, one hour; laboratory, four hours. Three semester credits. Prerequisite: Course 55 or its equivalent.

Flour mixtures and leavening agents are studied, especially as applied to the making of hot breads, cake and pastry; the remainder of the laboratory work is devoted to the principles involved in the cooking of various

protein-containing foods, such as eggs, milk, cheese, meats, fish, poultry, legumes and nuts. One or two simple meals are prepared and served in the laboratory. Especial emphasis is laid on the planning of menus for meatless meals.

57. **FOOD PROBLEMS I.** Second year, first semester. Laboratory, four hours. Two semester credits. Prerequisites: Courses 55 and 56, or their equivalent.

The canning and drying of fruits, vegetables and meats; the preparation of jellies, jams, preserves and pickles; preservation of eggs; more advanced work with flour mixtures, including bread making; preparation of more elaborate desserts, such as ice creams, sherbets, frappés, and steamed puddings; the making of various salads and sandwiches, and the utilization of left-over foods, comprise the work of this course.

58. **FOOD PROBLEMS II.** Second year, second semester. Recitation, two hours; laboratory, four hours. Four semester credits. Prerequisites: Courses 55, 56, and 57, or their equivalent.

In this and the preceding course, special emphasis is laid on the dietetic value and economic uses of foods. The work of this course includes the following: a brief consideration of the requirements of an adequate diet, together with planning of meals to meet these requirements; modifications of diet as required for students, men at hard manual labor, infants and small children, school children, the sick and aged; planning food for family groups and at stated costs; conservation of food, fuel and labor; practice in marketing and serving; planning and serving meals for special occasions and for large numbers. Meals are frequently prepared and served by the class throughout the semester to illustrate the principles brought out in class discussion.

HOUSEHOLD ECONOMICS

63. **HOME MANAGEMENT.** Second year, second semester. Recitation, two hours; laboratory, two hours. Three semester credits.

This course deals with the planning, furnishing and management of the home from the standpoint of efficiency. It includes a study of kitchen plans and equipment; arrangement of other rooms and of storage space; equipment and methods in cleaning and laundering; planning schedules of housework; planning family expenditures; keeping household accounts; buying household supplies.

64. **HOUSE SANITATION.** Third year, first semester. Recitation, two hours; laboratory, two hours. Three semester credits.

The location, ventilation, heating and lighting of the house, and rural and municipal water supply and sewage disposal, are considered from the standpoints of health, convenience and cost. The sanitary care of the house and of foods is studied, and the relation between public health problems and home sanitation is examined. The laboratory work includes the first-hand study of the sanitary conditions and equipment of local homes, streets, stores and other buildings, of the local water supply and sewage-disposal systems, and of local public health activities affecting the home.

65. **CHILD CARE AND HOME NURSING.** Third year, second semester. Recitation, two hours; laboratory, two hours. Three semester credits.

This course deals with the care of the mother and the preparation of the clothing and other supplies before the baby's birth; the bathing, dressing, feeding and daily routine of the infant; the care and training of children at different stages in their development, in accordance with their physical, mental, and emotional needs; the nature and symptoms of the diseases to which children are susceptible; the methods of preventing these diseases and of nursing the sick child; the treatment of emergencies and accidents in the home.

Special Courses

SPECIAL COURSES RELATED TO ENGINEERING

Automobile Repair
Tractor Operation
Carpentry
Machine Shop Work
Foundry Practice

Blacksmithing
Telegraphy
Radio Telegraphy
Electrical Repair Work

The following special courses are intended for those who have not the time or the means to take any of the regular engineering courses in the College, but who wish to obtain a practical working knowledge of automobile repair, tractor operation, carpentry, blacksmithing, foundry practice, machine shop work, electrical repair work, telegraphy, or radio telegraphy.

Students can enroll in any of the above courses, except radio, telegraphy, and electrical repair work, on the first Monday of any month from September to May. Courses in electrical repair work, radio, and telegraphy begin on the first Monday of January only. The length of the course depends upon the previous training and experience of the individual. Those pursuing courses for tractor operators, blacksmiths, carpenters, foundrymen, and telegraphers should arrange to remain at the College two months. The training for auto mechanics, machinists, or electricians requires a greater length of time. Students may remain for eighteen weeks if they desire to do so.

There is no charge for tuition, but an incidental fee of \$10 is charged at entrance, as is also a sick benefit fee of \$1.50, which entitles the student to free medical attendance from the College physician. Laboratory charges to cover the cost of materials used are made in accordance with the following schedule: automobile mechanics, \$18 a month; tractor operators, \$18 a month; blacksmiths, \$18 a month; machinists, \$18 a month; carpenters, \$9 a month; foundrymen, \$9 a month; radio operators, \$9 a month; telegraphers, \$9 a month; and electricians, \$18 a month.

The College reserves the right to revise its schedule of fees at any time without notice.

AUTOMOBILE REPAIR. The course in automobile repair includes a thorough study of the construction and assembly of four, six and eight-cylinder engines; the operation, testing and adjustment of these engines; electric ignition, starting, and lighting systems; the automobile chassis, including transmission systems and differentials; tire repair; general repairing, overhauling and operation of automobiles; and sufficient shop work to enable the student to make essential repairs.

Extensive equipment is available, including many types of cars and engines, machine tool tire repair equipment, and electrical equipment. All grades of work are given; the garage mechanic may supplement his knowledge with advanced and specialized work, or the amateur may begin at the bottom and obtain a comprehensive knowledge of the whole field.

TRACTOR OPERATION. The tractor course covers thoroughly the construction, operation, and adjustment of all kinds of tractors and their equipment; stationary gas engines; power farm machinery, including tractor hitches; and shop work.

About 20 tractors and 35 stationary gas engines are available for the laboratory work in this course, besides great numbers of smaller items of equipment in the way of magnetos, carburetors, and other attachments.

CARPENTRY. A practical study is made of general carpenter work, including the use of carpenters' tools, reading of drawings and blue prints, hand work and machine work, framing, building construction, and form building for concrete.

MACHINE SHOP WORK. The course in machine tool work is designed to meet the demands of those who must prepare themselves in a short time for this line of work. The work is adapted to the needs of the individual student. The entire machine shop of the College is available for this course, which includes a thorough training in the operation of lathes, planers, drill presses, boring mills, shapers, and grinding machines.

In order to enable the student to become familiar with both tools and shop processes, the construction of standard gasoline engines and wood lathes is followed from the machining of the rough castings to the assembly of finished parts. Students may in this way make their own engines and lathes.

FOUNDRY PRACTICE. This course is intended to train practical molders, and includes bench molding with a great variety of patterns; work with different kinds of sands and facings; open sand work; sweep molding; machine molding; core making; setting of cores, gates, and risers; different methods of venting; and general foundry practice.

BLACKSMITHING. A practical course is given in forging operations, such as drawing, welding, bending, twisting, and punching iron and steel, the care of forge fire; the making of various tools, such as punches, chisels, drills, scrapers, and hammers; hardening, tempering, annealing, case and pack hardening; and oxyacetylene and thermit processes of welding.

RADIO TELEGRAPHY. The work, which is intensive, is intended to fit students for commercial work, either on land or on board ships, in the least possible time. The training is similar to that which was used by the College in training radio operators for war service, and consists of instruction in the use of electrical instruments and radio apparatus, and in the use of the international code.

TELEGRAPHY. The great demand for telegraph operators has made it imperative that a number of persons be trained for this work. The course is open to both men and women, who in addition to other work devote at least four hours a day to sending and receiving. The Morse code is taught.

ELECTRICAL REPAIR WORK. This course is intended to train electricians, and includes electric wiring, and the operation of dynamos, motors, and other electrical equipment.

Farmers' Short Course

The Agricultural College offers in agriculture primarily a four-year curriculum, which gives the student fundamental training in the sciences relating to agriculture and their application to the production of crops and live stock and to farming in general. Such a curriculum not only equips a man to become a successful farmer, but makes of him a better citizen, and a leader in the broader duties of life.

Many men who have chosen farming as their vocation, and who are alive to some of the advantages offered by this institution to the farmers of the State, are denied the opportunity of pursuing the College curriculum in agriculture, or even as much as one year's work in that curriculum. For such men the Agricultural College provides the Farmers' Short Course.

This course is given for a period of eight weeks, practically the months of January and February, each year. It consists of an intensive study of a number of important phases of Kansas agriculture. The scope and nature of the work are indicated by the following outline of the subjects offered:

SUBJECTS IN FARMERS' SHORT COURSE

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and laboratory, respectively.

| | |
|----------------------------------|--------|
| Soils and Fertilizers..... | 4(4-0) |
| Grain Crops | 4(3-2) |
| Forage Crops | 4(3-2) |
| Live-stock Production | 8(6-4) |
| Live-stock Sanitation | 3(3-0) |
| Advanced Stock Judging..... | 2(0-4) |
| Dairying I | 5(3-4) |
| Dairying II | 5(3-4) |
| Farm Horticulture | 8(6-4) |
| Poultry Husbandry | 3(3-0) |
| Incubation and Brooding (a)..... | 3(0-6) |
| Farm Management | 4(3-2) |
| Beekeeping | 6(4-4) |
| Farm Insects | 2(2-0) |
| Injurious Rodents | 2(2-0) |
| Field Machinery | 1(0-2) |
| Special Lectures | 1(2-0) |

For each hour of recitation per week usually at least one hour of outside preparation is required. Laboratory or field work requires little or no outside preparation. Each credit (standard for measuring the quantity of work done) represents not less than two hours' work per week for the entire eight weeks of the term. A regular, full-time assignment consists of not less than twenty credits, and students are usually not encouraged to take more than twenty-four credits.

All the work is elective. That is, each student selects, with the advice of members of the Faculty, the subjects of his greatest interest or those he feels will do him the most good. Besides studying the subjects heretofore listed, the student may spend one, two or three half-days each week in instruction and practice in carpentry or blacksmithing, or both.

Students desiring further work in farm engineering are referred to "Special Courses Related to Engineering," discussed elsewhere in this

(a) This work is all practice work under supervision. Each student taking the subject must report to the Poultry Farm three times a day, seven days a week.

catalogue. For example, a man may take intensive work for the training of auto mechanics or tractor operators during part or all of the months of September, October, November and December, or during part or all of the months of March, April and May, and during the months of January and February devote himself almost exclusively to Farmers' Short-course work.

It must be noted that Farmers' Short-course work cannot be taken at any other time during the year than during this midwinter, eight-week term. Furthermore, students expecting credit must continue the work for the entire term.

CERTIFICATE. Most students will find it impossible to carry all the Farmers' Short-course work in which they are interested during one eight-week term. Such students are encouraged to take other subjects for a second winter term. Subjects in addition to those already listed may be provided to meet special demands as they arise. A certificate will be granted to each student completing satisfactorily forty credit hours of short-course work.

REQUIREMENTS FOR ADMISSION. This course is intended primarily for mature individuals. High-school work in the State is becoming so general and available to all communities that the demand for short-course work for boys of high-school age is being greatly reduced. Young farmers, not in school, are especially urged to consider the advantages of the Farmers' Short Course. Students over seventeen years of age are admitted without examination.

There is no charge for tuition, but each student is required to pay, on enrollment, an incidental fee of \$5, also a sick-benefit fee of \$1. This latter fee entitles him to free medical attendance by the College physician. In several of the laboratories, laboratory deposits varying from 50 cents upward must be made to cover cost of materials used.

SELF SUPPORT. The subjects of this course are primarily practical. They bring the student into actual contact with farm conditions and products. Besides the classroom work, many hours each week are spent in the stock-judging pavilion, laboratory, shop, and barn. This leaves the student but little time for outside labor, and students are therefore advised to come provided with as nearly all the necessary funds for the course as possible.

BRIEF DESCRIPTION OF THE WORK

SOILS AND FERTILIZERS. (Agron. 3.) In this class the various soil types common in Kansas are studied, especially with reference to their economical management for the production of profitable crops and the maintenance of fertility.

GRAIN CROPS. (Agron. 1.) The work in this subject consists of a practical study of grain-crop production. In the laboratory exercises are given for the identification of different kinds of threshed grain and the determination of damage and market classes and grades.

FORAGE CROPS. (Agron. 2.) This class makes a study of the distribution and production of important forage crops, especially for Kansas conditions. Practical exercises in identification are given in the laboratory.

LIVE-STOCK PRODUCTION. (An. Husb. 6.) The work of this class consists of a study and discussion of the elementary but fundamental principles of live-stock feeding, breeding, and management. Some attention is given to the history of breeds and pedigrees and to fitting for shows and sales. About three-fourths of the time in the laboratory is devoted to judging various classes and market grades of live stock, and the remainder to demonstrations in the killing, cutting, curing and storing of meats on the farm.

LIVE-STOCK SANITATION. (Vet. Med. 1.) This subject deals with diseases that are communicable from animal to animal or from animal to man. The causes, symptoms and methods that are employed to prevent and to combat the spread of diseases, and the drugs that are commonly used as disinfectants, for washes, dips, etc., are given full consideration. The use of serums, vaccines, etc., for the prevention of diseases is considered. Methods of disposal of sick and dead animals as well as the means employed to clean and to disinfect the premises so as to prevent a recurrence of diseases are considered.

ADVANCED STOCK JUDGING. (An. Husb. 7.) The work of this class consists largely of the judging of breeding classes of horses, cattle, sheep, and swine. Methods used in judging at county and State fairs are followed. Special attention is given to the selection of foundation stock for pure-bred herds.

DAIRYING I. (Dairy Husb. 1.) This class considers the general subject of farm dairying, including the composition and properties of milk, the feeding of the dairy cow, the selecting and breeding of the dairy herd, and dairy sanitation. The laboratory provides practical work with the Babcock tester, in the use of the farm separator, and in butter making.

DAIRYING II. (Dairy Husb. 3.) Among the subjects studied and discussed in this class are the following: Keeping records and accounts of dairy-farm business; building up the dairy herd; dairy buildings and equipment; silos and silage; the dairy business and soil fertility; cow-testing associations; coöperative ownership of dairy sires; and detailed plans for the management of the dairy farm. Laboratory work consists of judging dairy cattle from the standpoint of economical production and breed type. Score cards are used for the purpose of making the student systematic and accurate in the selection of dairy animals.

FARM HORTICULTURE. (Hort. 1.) The class work covers vegetable gardening and fruit growing, particular attention being paid to their relation to other farm enterprises. An attempt is made to acquaint the student with those horticultural principles and practices which are concerned in making the farm a better place for a home. The planning of the farmstead and the improvement of its appearance by the use of trees, shrubs and flowers is considered. Methods of handling and marketing products are briefly discussed. The laboratory work gives students practice in budding, grafting and other methods of plant propagation, as well as in pruning. Spraying and orchard management are briefly discussed.

POULTRY HUSBANDRY. (Poult. Husb. 1.) The work in Poultry Husbandry covers the practical phases of poultry management, including feeding, breeding, housing, incubation, and brooding.

INCUBATION AND BROODING. (Poult. Husb. 2.) This work is entirely individual practice work, each student carrying through a hatch and brooding the chicks. The student cares for the incubator, tests the eggs, and keeps necessary records. He also has entire care of brooding and feeding the chicks during the most critical weeks.

FARM MANAGEMENT. (Ag. Ec. 1.) In this class the work in the various agricultural subjects is correlated and placed on a practical, workable basis. The principles of farm accounting, distribution of capital, laying out of fields, planning rotations, etc., are given first consideration.

BEEKEEPING. (Ent. 10.) This subject considers the elements of practical beekeeping. The topics discussed include: Life history, behavior and instincts of the honeybee; products of the apiary; and relation of bees to crop production. A study is made of the various bee diseases, together with their treatment. The laboratory exercises consist of practice in constructing hives, supers, brood frames, comb-honey sections, extracting frames, and wiring frames; also of practice in putting in and embedding foundation. Demonstrations are given of various methods of transferring bees, manipulating colonies for swarm prevention and making increase, treatment of brood diseases, and wintering. The object of the work is to give such practical training as will prepare the student to engage successfully in beekeeping.

FARM INSECTS. (Ent. 1.) The serious insect pests of the farm, garden and orchard and those affecting domestic animals are discussed in this class. Methods of control are emphasized and the importance of clean culture and good farm methods is fully considered. Lantern slides are used in some of the presentations.

INJURIOUS RODENTS. (Zoöl. 1.) In this class a study is made of injurious rodents, especially gophers, prairie dogs, rats, mice, moles and rabbits, emphasizing their habits and the methods of poisoning, trapping, and otherwise destroying them.

FIELD MACHINERY. (Farm Engr. 1.) In this subject practical laboratory work is done by the student, the purpose being to acquaint him with the factors underlying wise selection and proper care of farm machines, as well as with methods of operation of a number of the most important machines. Rope work is given due consideration. Fences and the farm power plant are studied.

SPECIAL LECTURES. It is desirable to have frequent assemblies of all Farmers' Short-course students. Many subjects of timely and special interest cannot be discussed effectively in the regular classes. Two hours each week are set apart to provide these general meetings and opportunity for the presentation of fundamental phases of the work of the course not otherwise provided for. One credit is given for attending these meetings, and every Farmers' Short-course student is urged to enroll. Among the speakers provided will be several members of the College Faculty, including the President of the College, and a few outside, well-known agricultural leaders.

Commercial Creamery Short Course

To young men in the State desiring to engage in the creamery business as managers, or as butter or cheese makers, or for those who desire to engage in the business of handling market milk or ice cream, the State Agricultural College offers an eight-week course of technical training along these lines. The scope of the work, the nature of its various phases, and the comparative amount of time devoted to each are indicated by the following outline:

SUBJECTS IN COMMERCIAL CREAMERY SHORT COURSE

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and laboratory, respectively.

| | |
|--|---------|
| Creamery Management | 2 (2-0) |
| Creamery Butter Making..... | 8 (4-8) |
| Market Milk | 2 (2-0) |
| Dairy Bacteriology | 2 (2-0) |
| Cheese and Ice Cream Making..... | 4 (2-4) |
| Judging Dairy Products..... | 1 (0-2) |
| Dairying II | 5 (3-4) |
| Dairy Mechanics and Refrigeration..... | 2 (0-4) |

There is no charge for tuition in this short course. Each student is required to pay on enrollment an incidental fee of \$5, a laboratory charge of \$2, and a sick-benefit fee of \$1. This latter fee entitles him to free medical attendance by the College physician.

A certificate will be issued to Creamery Short-course students who satisfactorily complete all of the required work outlined above, and who show satisfactory evidence of having spent at least six months successfully in actual work in a creamery. Students without this practical experience may acquire it after completing the course. They will then receive their certificate.

BRIEF DESCRIPTION OF THE WORK

CREAMERY MANAGEMENT.—This class makes a study of the management of dairy manufacturing plants. Particular attention is given to overrun, manufacturing losses, costs, marketing, advertising, salesmanship, and bookkeeping.

CREAMERY BUTTERMaking.—The lectures given in this class cover receiving, grading, and testing cream and milk; neutralization, pasteurization, and cream ripening; and churning, giving particular attention to the moisture content. The laboratory work consists of buttermaking in the College creamery and provides opportunity for the application of the principles discussed in the classroom.

MARKET MILK—The problems concerned in the care and handling of milk in city milk plants are discussed in this class. The subjects considered include standardization, separation, clarification, pasteurization, and bottling of milk and cream; also the care of utensils and the distribution of milk.

DAIRY BACTERIOLOGY.—The work in this subject is chiefly laboratory work supplemented by brief lectures and explanations. It is designed for students who have had no training in chemistry and biology, and is a general study of the bacteriology of milk and milk products. Bacteriological contaminations of milk from air, water, utensils, the cow, and the

milker are discussed. Normal and abnormal fermentations, their significance and control in milk, butter, cheese, and special dairy products are considered.

CHEESE AND ICE CREAM MAKING.—The class work in this subject considers the standardization of ice cream mixes for fat and total solids; the use of the emulsifier; and the freezing, packing, and storing of ice cream. Laboratory work provides actual experience in the application of the principles studied. While the major portion of the time is devoted to ice cream, due consideration and practice is provided in the manufacture of cheddar and soft cheeses.

JUDGING DAIRY PRODUCTS.—The work provided for this class consists of scoring and judging butter, cheese, milk, and ice cream. It is chiefly laboratory work, though supplemented by occasional lectures.

DAIRYING II. This is the same subject as that included in the Farmers' Short Course, and a brief statement of the work included may be found in that write-up.

DAIRY MECHANICS AND REFRIGERATION. The work in this class provides careful consideration of the compression systems of refrigeration. It also includes the operation, care, and repair of refrigerating machinery and its auxiliaries.

COURSE IN TESTING DAIRY PRODUCTS

The law of the State requires that all persons buying milk or cream by test must pass a satisfactory examination and secure a certificate from the State Dairy Commissioner. A four days' course for cream-station operators is offered at the College during Farm and Home Week to those who wish to gain, in a short time, skill and accuracy in the application of the various tests necessary in such work, and ability to pass the required examination. Applicants are given the opportunity of doing practical work in sampling, testing and grading cream. Lectures are given on points which are necessary for the successful operation of a cream station. A written examination is given on the last day of the course.

Final examinations are regularly held at the College the first Tuesday in each month. Final examinations are also held at various places throughout the State during the year for those who are unable to make the trip to Manhattan. Schedules of these examinations may be had by writing the State Dairy Commissioner, Manhattan, Kan.

Housekeepers' Course in Home Economics

There are large numbers of young women who, from lack of time, are unable to take an extended course, but who recognize the need for special training in home making. The twentieth century demands of home managers an understanding of the sanitary requirements of the home, a knowledge of values, absolute and relative, of the articles used in the house, quick attention to details, good judgment in buying, and a ready adaptation of means to the end in view. The purpose of the Housekeepers' Course is to furnish this training. The teaching in this course is no less accurate than in the regular course, but is necessarily different. Given to students without scientific training, the instruction must be more largely a presentation of facts, without an elaboration of the underlying principles. The work is intensely practical, and the hundreds of young women who take this course go back to their homes with a broader view of life, and a knowledge and training that will enable them to meet their responsibilities. This course is given during the first fifteen weeks of each semester.

REQUIREMENTS FOR ADMISSION. Young women between the ages of eighteen and twenty-one are admitted upon presentation of common-school diploma, grammar-school certificate, or high-school diploma. Young women over twenty-one years of age are admitted without examination.

HOUSEKEEPERS' COURSE

Cookery
Sewing
Hygiene

Floriculture
Design in the Home and in Clothing
Housewifery

1. COOKERY. Both semesters. Laboratory, nine hours.

Stoves, stove construction, stove management, and fuels are the first topics considered. This discussion is followed by experiments illustrating the effect of heat upon starch and proteins. The necessary elementary principles involved are then applied to the cooking of cereals, vegetables, beverages, breads, meats, soups, simple cake mixtures, and puddings, and to the canning and preserving of fruits and vegetables. Special attention is given to the planning and serving of meals.

2. SEWING. Both semesters. Laboratory, ten hours.

This course includes practice in hand and machine sewing and dress-making. The fundamental stitches are applied to simple articles and to the repairing of garments. Practice is given in the use of the sewing machine, and in the adaptation of commercial patterns. Suitable materials and trimmings are discussed, and undergarments, a shirt waist, and a cloth dress are made. Notebook work is required.

3. HYGIENE. Both semesters. Class work, three hours.

This course deals with the principles of elementary hygiene and their application in the maintenance of personal health and of sanitary conditions in the home and community. A study is made of the prevention and control of disease through personal hygiene, the sanitary care of the house, and public health work. Attention is also given to the recognition and reporting of symptoms, the practical care of the sick, and the giving of first-aid treatment in common emergencies in the home.

4. DESIGN IN THE HOME AND IN CLOTHING. Both semesters. Laboratory, six hours.

This course makes a study of the design principles used in dress and in the problems of the home. Suitable lines and colors for dress are discussed and many practical problems are given. In home decoration the study involves the choice and arrangement of furniture, the choice of wall paper and of rugs, the use of color in the home, and the selection and arrangement of pictures.

5. FLORICULTURE. Both semesters. Class work, two hours.

Lectures in the classroom are supplemented in the greenhouse by practical exercises dealing with the propagation and culture of flowers. Soil requirements, the planting of seeds, transplanting, cultivation, the making of cuttings, the selection of varieties adapted to the purpose of window gardening, and lawn planting and cutting are discussed in the lectures. An opportunity to become acquainted with the species recommended and with the operations necessary for their successful culture is afforded in the laboratory practice.

6. HOUSEWIFERY. Both semesters. Laboratory, three hours.

This is a course in practical housekeeping, emphasis being placed upon efficiency in the use of time, money, and strength. It includes a study of house plans, furnishings and equipment, the cleaning and care of rooms, laundering and the care of clothing, the planning of expenditures, buying of supplies, and keeping of accounts.

One-year Curriculum in Lunch-room Management

It is the purpose of this curriculum to offer training to mature women who are fitted by education and ability to carry on some form of lunch-room management. The positions open to such women will be commercial ones only, as the department reserves the right to recommend only the members of the College institutional classes for positions in educational institutions and hospitals.

The curriculum covers one year, and certificates are granted on the successful completion of the work.

REQUIREMENTS FOR ADMISSION. The curriculum is open to women twenty-five years of age or older. Applications for entrance must be made in writing, and applicants are chosen according to training and ability. The number in the class is limited to twenty, in order to give each member the personal training necessary.

HOW TO APPLY FOR ENTRANCE. A student desiring admission to this curriculum is asked to write a letter, stating her general qualifications and training, to the Dean of the Division of Home Economics. After consideration by the Dean of the Division, the candidates for this course will be chosen.

LUNCH-ROOM MANAGEMENT CURRICULUM

| | |
|--------------------------------------|----------------------|
| Principles of Cookery..... | 4(0-12) |
| Food Production and Marketing..... | 3(3-0) |
| Business English LR..... | 3(3-0) |
| Cafeteria Practice I..... | 2(0-6) |
| Sanitation and Hygiene..... | 1(1-0) |
| Furnishing and Decorating..... | 1(0-3) |
| Institutional Cookery..... | 4(1-9) |
| Accounting..... | 2(2-0) |
| Lunch-room Management..... | 2(2-0) |
| Cafeteria and Tea-room Practice..... | 4(1-12) |
| Lunch-room Promotion..... | 1, for half semester |
| Meal Planning..... | 1, for half semester |

1. **PRINCIPLES OF COOKERY.** First semester. Laboratory, twelve hours.
The purpose of this course is to teach the principles of cookery by means of the preparation of different foods. This course includes both plain and fancy cookery. A standard system of measurement is taught, and special attention is given to training in accuracy, neatness, and economy in handling utensils and materials. Standard servings and the cost of prepared foods are carefully estimated.

2. **FOOD PRODUCTION AND MARKETING.** First semester. Class work, three hours.

The main points in source, production, and manufacture of foods are covered. Special stress is laid on marketing and buying for the lunch room. Food values are emphasized.

3. **SANITATION AND HYGIENE.** First semester. Class work, one hour.
The sanitary control of eating-houses and food supply, together with the personal hygiene of the worker, are here discussed.

4. **CAFETERIA PRACTICE I.** First semester. Laboratory, six hours.
The purpose of this course is to make the student thoroughly familiar with the cafeteria. Experience is had in serving, checking and other details.

5. **CAFETERIA AND TEA-ROOM PRACTICE.** Second semester. Laboratory, twelve hours.

Experience in the cafeteria is continued, with practice in the preparation of food. During part of the course the students carry on a tea-room in the dining room of the department. So far as it is practicable, opportunity is given to do catering. Careful attention is given to service and cost of maintenance.

6. **BUSINESS ENGLISH LR.** First semester. Class work and practice, three hours.

This course is designed to meet the needs of those who are especially preparing themselves to manage lunch rooms. Essential forms of business correspondence, contract forms, the best forms of making and displaying notices and posters, the best current literature in home economics, and well-directed cultural reading are given their proper emphasis.

7. **FURNISHING AND DECORATING.** First semester. Laboratory, three hours.

Color, form, and arrangement as applied to wall and floor coverings, furniture, linen, china, and silver are studied.

8. **INSTITUTIONAL COOKERY.** Second semester. Class work, one hour; laboratory, nine hours.

This course applies the principles of cookery to the preparation of large quantities of food for use in the cafeteria. The course is given in the kitchen laboratory of the cafeteria.

9. **ACCOUNTING.** Second semester. Class work, two hours.

This is a course in the elements of bookkeeping and of business practice as applied to the accounts of lunch rooms, tea rooms, and cafeterias.

10. **LUNCH-ROOM MANAGEMENT.** Second semester. Class work, two hours.

The course covers the field organization, equipment, service, and general management of lunch rooms.

11. **MEAL PLANNING** Second semester. Class work, one hour for half the semester.

The planning of meals according to dietary standards is taught in this course. Practice is given in planning menus for cafeterias and tea rooms.

12. LUNCH-ROOM PROMOTION. Second semester. Class work, one hour for half the semester.

The purpose of the course is to show the practical application of the principles of advertising and publicity to the enterprises treated in the course in lunch-room management. The several kinds of advertising are taken up in their relation to the lines of business which the students plan to enter. The principles of typographical design as adapted to menu cards and other necessary printed material receive careful attention.

Degrees and Certificates Conferred

IN THE YEAR 1919

First Division, June 5

Degrees Conferred

GRADUATE COURSES

MASTER OF SCIENCE

William Hiddleston Andrews, A. B., University of Chicago, 1900
Stella Maude Harriss, B. S., Kansas State Agricultural College, 1917
Levi Jackson Horlacher, B. S. A., Purdue University, 1917
William Preston Tuttle, B. S. A., University of Kentucky, 1915

AGRICULTURAL ENGINEER

Frank Clark Lewis, B. S., Kansas State Agricultural College, 1913

CIVIL ENGINEER

Earl Livingston Hageman, B. S., Kansas State Agricultural College, 1911

ELECTRICAL ENGINEER

Lawrence Archibald O'Brien, B. S., Kansas State Agricultural College, 1914

UNDERGRADUATE CURRICULA

Division of Agriculture

BACHELOR OF SCIENCE IN AGRICULTURE

James Bell Angle
Turner Barger
Wert Walton Bell
George Yeomans Blair
John Allen Clarke
Shirley Blanch French
Fred Griffee
Earl Martin Hiestand
Clara Higgins
Orin Willard Hinshaw
Frank Wilson Howard
William Curtis Janssen
Lea Nathan Jewett
Robert Warren Kilbourn

Howard Allyn Lindsley
John Long MacNair
Coleman White McCampbell
Howard Waitman Phillips
Floyd Meredith Pickrell
Everett Jacob Price
Louis Vernon Ritter
Louis Henry Rochford
Arthur Frithiof Swanson
Ralph Scoles Westcott
Carl Edward Wettig
Edwin Frederick Whedon
Frank Wilson

DOCTOR OF VETERINARY MEDICINE

Arthur Esco Bate
Fred Robert Beaudette
Frank King Hansen
Elijah Harrison Ikard
Roy Reece Parker

Evan Hart Richardson
August Ernest Schattenburg
Gail Morris Umberger
Frank Blackmore Young
Charles Edward Zollinger

Division of Engineering

BACHELOR OF SCIENCE IN AGRICULTURAL ENGINEERING

Lloyd Harmon Bunnel

BACHELOR OF SCIENCE IN ARCHITECTURE

Myron Ernest Johnson

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Edwin Osburn Adee
Roy William Haage

William Axtell Norman

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Jesse Alfred Cook
Homer Cross
Glenn Worth McCracken
John Stephen Painter

Herbert Gordon Schultz
Ralph Andrew Van Trine
Errol Thomas Williamson

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Trafford William Bigger
Seibert Fairman
Gordon Wilfred Hamilton
Stanley Paul Hunt

Dan Glen Lake
George Aaron Miller
Lawrence Artman Tilton

Division of Home Economics**BACHELOR OF SCIENCE IN HOME ECONOMICS**

Alto Mae Adams
Elizabeth Adams
Ruth Helen Allen
Madge Gladys Austin
Edna Louise Beckman
Gladys Bergier
Mildred Content Berry
Lith Frances Biggs
Ruth Blair
Vera Fayne Bondurant
Ruth Borthwick
Mildred Carrie Browning
Lois Ava Burton
Lucile Margaret Carey
Quinta Pearl Cates
Mary Ita Covert
Margaret Elizabeth Crumbaker
Florence Lillian Dial
Hattie Estelle Droll
Minnie Josephine Dubbs
Lenore Maria Edgerton
Ruby Anna Ellerman
Maurine Fitzgerald
Murl Gann
Hattie Pauline Gesner
Helen Isabel Gott
Mary Frances Haack
Edith Theodora Hall
Lucile Halleck
Alice Tibbetts Harkness
Eva Harvey
Kathryn Browning Haycock
Helen Lucile Heiser
Sarella Lucile Herrick
Ruth Kathrina Huff

Gussie Christina Johnson
Maude Emily Kershaw
Mary Kirkpatrick
Evalene Kramer
Alpha Corrinne Latzke
Esther Naomi Latzke
Lavinia Leibengood
Mildred Kelly Levi
Elizabeth Cora May
Olive Charlotte Logerstrom
Helen McIlrath
Irma Ellen McKinnell
Mary Aletha Mason
Lora Gertrude Mendenhall
Florence Eleanor Mitchell
Mary Ethel Mitchell
Hilda Ruth Moore
Ruth Ann Morgan
Vera Oviatte Olmstead
Ruth Elizabeth Orr
Ruth Rosabell Phillips
Maybell Rodgers
Frances Elizabeth Russell
Vera Leone Samuel
Adelaide Seeds
Nellie Gladys Shoup
Lola Mae Sloop
Eva Jeanette Snyder
Ethel Gladys Switzer
Ruth Elizabeth Thomas
Gertrude Uhley
Myrtle Cornelia Vanderwilt
Martha Coats Webb
Hazel Merillat Williams
Edythe May Wilson

Division of General Science**BACHELOR OF SCIENCE**

Sarah Joanna Boell
Solomon Richard Brinker
Frank Swartz Campbell
Elizabeth Agnes Cotton
Nora May Dappen
Philip Alexander Kennicott
Robert Donald MacGregor

Pearl Lily Miltner
Harrison Earl Mitchell
Alice Morton
Flora Roccina Parker
Clifford Symes Rude
Lloyd Bonham Souders
Nettie May Wismer

BACHELOR OF SCIENCE IN INDUSTRIAL JOURNALISM

Bruce Browne Brewer
Ralph Harold Heppie

Laura Dwelle Moore
Sara Chase Yost

Certificates Conferred**CERTIFICATE IN AGRICULTURE**

Henry Jencie Carr
Robert Jerome Foulke

Francis Chapman Sanford
Byron Alexander Vannordstrand

CERTIFICATE IN VETERINARY MEDICINE

Chester Anderson King

CERTIFICATE IN ELECTRICIANS' SHORT COURSE

Oscar Hugh Aydelotte
Fern Frank Cappus
James William Donovan
Asabel Delma Hinshaw

Olma Monroe Rath
Floyd Rice
Ralph Burton Ricklefs

CERTIFICATE IN AUTO MECHANICS' SHORT COURSE

Harold Blackburne Allen
Wayne Elsworth Anderson
Harold William Arnold
Lyman Edwin Bailey
Charles Otis Bates
Fred August Braun
Floyd Thornton Bushell
James Burke Campbell
Alfred James Carlson
Cra-ton Edwin Carney
Olin Loue Dikeman
Raymond Dikeman
Oscar Daniel Ekstrum
George Jacob Evans
Clarence Marshal Garten
Edward Andy Henke

Arthur Robert Johnson
Ralph Nevins Johnson
Virgil W. Johnson
George Aubrey Locke
William E. McManis
Reynold E. H. Nordgren
George Barton Randle
Max Duane Roberts
Harold Sargent
Lewis Henry Schiesser
Elmer Burton Shull
Donald Oneil Signor
Alfred Walter Sinclair
John J. Snodgrass
Clarence Jay Thorne
Ernest William Williams

CERTIFICATE IN BLACKSMITHS' SHORT COURSE

David M. Heilman
Wilbur Wakefield Wikoff

John Albert Young

CERTIFICATE IN MACHINISTS' SHORT COURSE

Ira Francis Hites
Marcus Alexander Hites

Archibald Hurtgen
Clyde M. Rogers

CERTIFICATE IN CARPENTERS' SHORT COURSE

Louis Ira Carpenter

Elmer Leroy Copeland

CERTIFICATE IN TRACTOR OPERATORS' SHORT COURSE

Annas Lee Anderson
Ross David Arnold
Leonard Elbert Bales
William Frederick Barber
Herbert John Barr
Fred August Barre
Henry Oliver Benedict
John William Beyer
James Lloyd Boller
George Bradbury
Willie Jacob Braum
Lee T. Burnett
Charles Edward Christoph
Justin Bert Cooke
Robert Ivan Davis
Henry Orvil Ellerman
Clarence Cornelius Ericson
Richard Andrew Erickson
Julius Christopher Fabel
Will Charles Fankhauser
Otis Lester Franklin
Clyde Dow Frost
Albert Edward Gage
Victor Leonidas Gaston
James A. Gorton
Quincy Adam Groh
Carl Harvey Hartman
Merlin Wilson Hawk
Edwin Homer Hochuli
Claude Edward Hollenbeck
Louis Jahnke
Fred Hans Johnson
Gustav Adolph Lueker

Martin Henry Lueker
Irwin Hamilton McCutchan
Eugene Joseph McGrath
Chris John Mall
William Herbert Marcy
Alva Arnold Moore
Elmer Ellsworth Murphy
Arnold Jergen Nanninga
Elwin William Niccum
Carl Leander Nohlen
John F. Oelrichs
Burr Harvey Ozment
Glenn Rolander Peterson
Carl Predmore
Edward Henry Rice
Nicol Gosler Rogler
Earl William Rubart
Fred Sachau
Charles P. Schofield
Louis Ethen Schultz
Isaac Ray Teagarden
Doyle Johnson Underwood
Laurence Reber Vaniman
Nathan Bailey Vaughn
George M. Walz
Dwight Robert Weinland
Martin Raymond Westling
Edward Francis Whelan
John S. Winzeler
Dewey David Wood
Charles Stephen Wood
Paul Brower Young

CERTIFICATE IN HOUSEKEEPERS' SHORT COURSE

Claretta Odessa Allen
Lucile Henrietta Keen

Celia Pipes
Katie Roberts

CERTIFICATE IN MUSIC

Nina Bess Curry

Helen McClanahan Keith

CERTIFICATE IN PUBLIC SCHOOL MUSIC

Ollie Wilson Klotz

Second Division

Degrees Conferred

Division of Agriculture

BACHELOR OF SCIENCE IN AGRICULTURE

Carl Vincent Maloney*
Edgar Martin*

Charles Lorin Quear*

Division of Home Economics

BACHELOR OF SCIENCE IN HOME ECONOMICS

Ravenna Elizabeth Brown**
Mary Grace Crumbaker*
Bertha Edna Flynn*
Myrtle Annice Gunselman**
Frances Keneaster Hancock*

Marie Manser*
Lael Louise Porter*
Ruth Georgia Taylor*
Aurolyn Agnes Vandivert*
Donna Paye Wilson*

Division of General Science

BACHELOR OF SCIENCE

Mary Avis Blain*
Beatty Hope Fleenor*
George Albert Foltz*

Addie Ruth Sandman**
Mary Fidelia Taylor*
Nellie Flo Yantis*

BACHELOR OF SCIENCE IN INDUSTRIAL JOURNALISM

Ruth Bernese Henderson*

Julia Annette Keeler**

Division of Veterinary Medicine

DOCTOR OF VETERINARY MEDICINE

Harry Jonas Austin*

Howard Adams O'Brien*

CERTIFICATE IN PUBLIC SCHOOL MUSIC

Bernice Wilson Klotz*

* August 8, 1919. ** September 1, 1919.

Honors

SENIOR HONORS

(June, 1919)

DIVISION OF AGRICULTURE

Blanche Shirley French
Fred Robert Beaudette

Fred Griffee

DIVISION OF ENGINEERING

John Stephen Painter

Glenn Worth McCracken

DIVISION OF HOME ECONOMICS

Sarella Lucile Herrick
Alpha Corrine Latzke
Esther Naomi Latzke

Frances Elizabeth Russell
Ruth Georgia Taylor

DIVISION OF GENERAL SCIENCE

Laura Dwella Moore

Nettie May Wismer

JUNIOR HONORS

(June, 1919)

DIVISION OF AGRICULTURE

Luella Clara Schaumberg

Boyd Funston Agnew

DIVISION OF ENGINEERING

Paul Lowell Fetzer

Frank Louis Sahlmann

DIVISION OF HOME ECONOMICS

Agnes Eloise Flanders
Mary Jane Hill

Loverne Webb

DIVISION OF GENERAL SCIENCE

Blanche Martha Sappenfield

Jewell Dan Sappenfield

PHI KAPPA PHI

(Class of 1919)

Fred Robert Beaudette
Fayne Vera Bondurant
Blanche Shirley French
Fred Griffee
Sarella Lucile Herrick
Alpha Corrine Latzke
Esther Naomi Latzke
Glenn Worth McCracken

Pearl Lily Miltner
Laura Dwella Moore
Vera Oviatte Olmstead
John Stephen Painter
Frances Elizabeth Russell
Vera Leone Samuel
Ruth Georgia Taylor
Nettie May Wismer

List of Students

Graduate Students

CANDIDATES FOR MASTER'S DEGREE, 1920

- Dorothy Josephine Cashen, B. S. 1917 (Carthage College), *Botany*
Manhattan
- Ernest Edward Dale, A. B. 1913 (University of Nebraska), *Botany*
Greenwood, Neb.
- George William Finley, B. S. 1896 (Kansas State Agricultural College), *Mathematics*
Santa Rosa, Cal.
- Frank Elmer Fox, B. S. 1915 (Iowa State College), *Chemistry*
Manhattan
- Leonard Sinclair Hobbs, B. S. 1916 (Texas Agricultural and Mechanical College),
Engineering
Manhattan
- Harry Llewellyn Kent, B. S. 1913 (Kansas State Agricultural College), *Education*
Manhattan
- Edward Staunton West, A. B. 1917 (Randolph Macon College), *Chemistry*
Stuart, Va.

GRADUATE STUDENTS WORKING TOWARD MASTER'S DEGREE

- Emily Harriet Anderson, B. S. 1919 (University of Wyoming), *Home Economics*
Laramie, Wyo.
- Julia Baker Alder, B. S. 1914 (Kansas State Agricultural College), *English*
Manhattan
- William Charles Bellis, B. S. 1919 (University of Arizona), *Animal Husbandry*
Berkeley, Cal.
- Katharine Maxwell Bower, B. S. 1915 (Kansas State Agricultural College), *English*
Kansas City, Mo.
- Frank Swartz Campbell, B. S. 1919 (Kansas State Agricultural College), *Chemistry*
Manhattan
- Thomas Arthur Case, B. S. 1912 (Kansas State Agricultural College),
Veterinary Medicine
Sterling
- Percy Walter Cockerill, B. S. 1915 (Kansas State Agricultural College), *Chemistry*
Manhattan
- Minnie Pence Curry, B. S. 1914 (Kansas State Agricultural College),
Mathematics and English
Manhattan
- William Renwick Curry, B. S. 1914 (Kansas State Agricultural College), *Education*
Manhattan
- Percy LeRoy DePuy, B. S. 1918 (Kansas State Agricultural College), *Zoölogy*
Manhattan
- Howard Robert DeRose, B. S. 1918 (University of Colorado), *Chemistry*
Manhattan
- Orin Willard Hinshaw, B. S. 1919 (Kansas State Agricultural College), *Horticulture*
Eureka
- Ruth Evalyn Hurd, B. S. 1918 (Carthage College), *Zoölogy*
Manhattan
- Charles Otis Johnston, B. S. 1918 (Kansas State Agricultural College), *Agriculture*
Manhattan
- Ernest Baker Keith, B. S. 1913 (Kansas State Agricultural College), *Chemistry*
Manhattan
- Henry White Marston, B. S. 1919 (University of Delaware), *Animal Husbandry*
Wilmington, Del.
- Elizabeth Mohlman, B. S. 1915 (Ottawa University), *English*
Manhattan
- Mary Gladys Payne, B. S. 1913 (Kansas State Agricultural College), *Home Economics*
Emporia
- Annette Woodward Perry, B. S. 1916 (Kansas State Agricultural College), *History*
Manhattan
- Harold Arthur Pratt, B. S. 1918 (Massachusetts Agricultural College), *Horticulture*
Shrewsbury, Mass.

- Clifford Rude, B. S. 1919 (Kansas State Agricultural College), *Zoölogy*
Manhattan
- Gladys Garnand Rude, B. S. 1918 (Kansas State Agricultural College), *Zoölogy*
Manhattan
- Wilbur Neilson Skourup, B. S. 1915 (Kansas State Agricultural College), *Chemistry*
Manhattan
- Miriam Russell Spicer, A. B. 1917 (University of Kansas), *General Science*
Lawrence
- Clara Victoria Thomas, B. S. 1919 (Nebraska Wesleyan University), *Foods and Chemistry*
Gothenburg, Neb.
- Francis Marion Wadley, B. S. 1916 (Kansas State Agricultural College), *General Science*
Manhattan
- Edith Willmann, A. B. 1919 (Columbia University), *Embryology*
New York City

GRADUATE STUDENTS NOT WORKING TOWARD MASTER'S DEGREE

- William Hiddleson Andrews, A. B. 1900 (University of Chicago); M. S. 1919 (Kansas State Agricultural College), *Education*
Manhattan
- Alice Lenore Brown, A. B. 1916 (University of Kansas), *Entomology*
Manhattan
- Allan Park Davidson, B. S. 1914 (Kansas State Agricultural College), *Education*
Manhattan
- Odessa Della Dow, B. S. 1906 (Kansas State Agricultural College), *Chemistry*
Manhattan
- Merrill Augustus Durland, B. S. 1918 (Kansas State Agricultural College), *Engineering*
Centralia
- Esther Gladys Hilbish, B. S. 1918 (Kansas State Agricultural College), *Home Economics*
Lewis
- William Adams Lippincott, A. B. 1903 (Illinois College); B. S. 1911 (Iowa State College);
M. S. 1917 (University of Wisconsin), *Zoölogy*,
Manhattan
- Helen Edna Rannels, B. S. 1913 (Kansas State Agricultural College), *Home Economics*
Manhattan
- Frances Elizabeth Stall, B. S. 1918 (Kansas State Agricultural College), *Music*
Kansas City
- Lois Emily Witham, B. S. 1916; M. S. 1918 (Kansas State Agricultural College), *Botany*
Manhattan

Undergraduate Students

The following list includes seniors, juniors, sophomores, freshmen and special students in College. For students in the Summer School and in special courses, see lists following this one.

. Abbreviations here used denote curricula as follows: Ag, agriculture; AC, agricultural chemistry; AE, agricultural engineering; Ar, architecture; BC, biochemistry; CE, civil engineering; EE, electrical engineering; FME, flour mill engineering; GS, general science; HE, home economics; IC, industrial chemistry; IJ industrial journalism; M, music; ME, mechanical engineering; and VM, veterinary medicine.

SENIORS

- Genevra Mae Adams (HE); Atchison
 Mabel Christmas Adams (HE); Garden City
 Ida Gertrude Adee (GS); Manhattan
 Boyd Funston Agnew (Ag); Yates Center
 Glen Allen (Ag); Burlington
 Nelson Joseph Anderson (GS); Burchard, Neb.
 John Wendell Andrews (GS); Manhattan
 Mildred Jeanette Arends (HE); Kansas City
 Emmet Stanley Bacon (VM); Emporia
 Herbert Nickson Baker (Ag); Tonganoxie
 Helen Hunt Bales (HE); Manhattan
 John William Barker (GS); Pratt
 Hugh Donald Barnes (CE); Blue Mound
 Carroll Mueller Barringer (Ag); Conover, N. C.
 Helen Cecile Beck (HE); Manhattan
 Clyde E. Beckett (CE); El Dorado
 Adelaide Evelyn Beedle (HE); Salina
 Sherman Floyd Bell (Ag); Perry
 Mabel Rose Bentley (GS); Valhalla
 Elmo Murray Berthoff (VM); Arkansas City
 Ernestine Biby (HE); Topeka
 Everett Allen Billings (Ag); Maple Hill
 Bertha Johanna Biltz (HE); Lindell
 Helen Williamine Blank (HE); Emporia
 Homer Conley Boyd (VM); Manhattan
 Nelson Boyle (Ag); Spivey
 Cleve Somerset Briggs (IJ); Parsons
 William Herbert Brooks (Ag); Stafford
 Joseph Oscar Brown (Ag); Sanford, Fla.
 Clarence Leland Browning (EE); Manhattan
 Esther Bruner (HE); St. Joseph, Mo.
 Vernon Everett Bundy (IJ); Manhattan
 Arthur Newton Burditt (GS); Ness City
 Phyllis Harriet Burt (HE); Eureka
 Bessie Catherine Burkold (HE); Ottawa
 Loring Enner Burton (GS); Manhattan
 Raymond Campbell (Ag); Parsons
 Myrtle Carey (HE); Houston, Tex.
 Hettie Carris (HE); Topeka
 Dora Lydia Cate (IJ); Manhattan
 Vera Cates (HE); Manhattan
 William Kamp Charles (IJ); Republic
 Imogene Marjorie Chase (GS); Manhattan
 Catherine Aleph Christman (HE); Wichita
 Elizabeth Duncan Circle (GS); Kiowa
 Russell Fesler Coffey (VM); Iola
 Frank Harold Collins (GS); Wellsville
 Sarah Alda Conrow (HE); Manhattan
 Joseph Hamilton Cook (Ag); Glasco
 Warren Eugene Crabtree (Ag); Manhattan
 Vernon Simpson Crippen (Ag); Langdon
 Simon Edward Croyle (CE); New Cambria
 May Dahnke (HE); Manhattan
 Vera Lucile Dahnke (HE); Manhattan
 Bertha Lewis Danheim (HE); Blue Rapids
 Helen Josephine Dawley (HE); Waldo
 Louise Dawson (GS); Clifton, Ariz.
 Lulu Elizabeth Deist (HE); Harper
 Arthur Reginald Denman (Ag); Manhattan
 Laura Viola Denman (GS); Manhattan
 Charles Boddie Downer (EE); Kansas City
 Hugh Byron Dudley (IJ); Kansas City
 Roy Kiefner Durham (GS); Anthony
 Hazel Viola Dyer (HE); Oberlin
 Charles Ranger Enlow (Ag); Harper
 Theodore Henry Enns (IJ); Inman
 John Franklin Erdley (VM); Holton
 Sivert Eriksen (VM); Kensal, N. Dak.
 Margaret Salina Etzold (HE); Liberal
 Mabel Lena Evans (HE); Liberal
 Morris Evans (Ag); Topeka
 Hobart Fairman (ME); Manhattan
 Ward Willard Fetrow (Ag); Haddam
 Paul Lowell Fetzer (ME); Manhattan
 Ina Ruth Findley (GS); Manhattan
 Paul Levi Findley (Ag); Manhattan
 Agnes Eloise Flanders (HE); Westboro, Mo.
 William Robert Folck (EE); Little River
 William Edward Forney (GS); Cottonwood Falls
- Abijah Wilcox Foster (Ag); Fairchild, Wis.
 Ralph Leon Foster (IJ); Courtland
 Ralph Emerson Franklin (EE); Horton
 Earle Wesley Frost (GS); Blue Rapids
 Mary Abigail Furneaux (HE); Moran
 Gladys Lorena Ganshird (HE); Manhattan
 Walter David Gardner (Ag); Kansas City
 Ethel Victoria Garrett (HE); Manhattan
 Isaac Frank Gatz (VM); McPherson
 Marie Gehr (HE); Manhattan
 Lester Frank Gfeller (EE); Junction City
 Laberta Ruth Gormley (HE); Hutchinson
 Howard M. Gillespie (Ag); Danville
 Grace Iola Gish (GS); Manhattan
 Bertha Elizabeth Glenn (HE); Manhattan
 Ruth Stephens Goodrum (HE); Lamar, Mo.
 Edwin Edgar Gottman (Ag); Kansas City
 John Francis Grady (CE); Lansing
 Robert Albert Graves (EE); Abilene
 Mamie Grimes (HE); Manhattan
 Dora Eva Grogger (HE); Manhattan
 Harold Reed Guilbert (Ag); Wallace
 Frank Harold Gulick (Ag); Winfield
 John Spence Gulledge (EE); Siloam Springs, Ark.
 Joseph Cunningham Gulledge (Ag); Manhattan
 Eva Maud Gwin (HE); Morrowville
 Mary Elizabeth Hagenbuch (HE); Troy
 William Carlton Hall (Ag); Coffeyville
 George Hamilton (ME); Manhattan
 Marie Hammerly (HE); Manhattan
 Claude Gustave Hansen (ME); Sedgwick
 Ruth Anna Harding (HE); Manhattan
 Robert Stanton Hargis (GS); Inman
 Floyd Hawkins (IJ); Manhattan
 Marie Ellen Haynes (HE); Emporia
 Francis Augustin Hennessy (Ag); Fulton
 Harry Bernice Hickman (VM); Norton, Mo.
 Mary Jane Hill (HE); Burlington
 Reginald Hinde (Ag); Manhattan
 Mary Hitch (HE); Guymon, Okla.
 Ralph Ward Hixson (VM); Hiawatha
 Lester Hoffman (GS); Abilene
 Samuel Willet Honeywell (EE); Poe
 Walter Rawlins Horlacher (Ag); Colby
 Carl Lewis Howard (Ag); Oakley
 David Marion Howard (Ag); Coldwater
 Stuart Laverne Hunt (VM); Blue Rapids
 Claude Elton Hutto (GS); Manhattan
 Clarence Huycke (ME); Ellsworth
 William Lewis Ikard (VM); Manhattan
 Guilford John Ikenberry (Ag); Quinter
 Jane Jenkins (HE); Boulder, Colo.
 Helen Myrtle Johnson (HE); Wichita
 Myrtle Johnson (GS); Manhattan
 Samuel Ray Johnson (VM); Blanchard, Iowa
 Mary Catherine Johnston (HE); Gardner
 Clare Kimport (Ag); Dellvale
 Chester Anderson King (VM); Emporia
 Amanda Kirkpatrick (HE); Montrose
 Elizabeth Emily Kirkpatrick (HE); Manhattan
 Joseph Ralph Lamont (GS); Manhattan
 Harold Fred Laubert (Ar); St. Joseph, Mo.
 Clay Forrest Laude (Ag); Rose
 Helen Unnetta Lawrence (HE); Junction City
 Carolyn Elizabeth Lear (HE); Stafford
 Paul Revier Lemly (EE); Ramona
 Lois Emily Litchfield (HE); Blackwell, Okla.
 Lucile Carol Logan (HE); Lyons
 Ann Marie Lorimer (HE); Olathe
 Gladys Love (HE); Kansas City, Mo.
 Frances Evelyn Lovett (HE); Eureka
 Bessie Lenore Lyman (HE); Manhattan
 Dilts Sprinkle McHugh (EE); Bucklin
 Ernest Lee McIntosh (Ag); Manhattan

SENIORS—concluded.

- Anna Leah McIntyre (HE); Topeka
 Leo Alphonsus Magrath (VM);
 Williamsburg
 Calvin Medlin (IJ); Manhattan
 Josephine Alta Meldrum (HE);
 Cedar Vale
 Velma Mae Meserve (HE); Ellis
 Adda Middleton (HE); Minneapolis
 Ward Ray Miles (Ag); Green
 Lloyd Rayburn Miller (CE); Belleville
 Nina Irene Miller (HE); Neodesha
 John Russell Mingle (Ag); Holton
 Florence Irene Mirick (HE); Otis
 Isaac Tennyson Mock (VM); Idana
 John Delmont Montague (Ag); Anthony
 Clara Belle Moore (HE); Holton
 Eloise Morrison (HE); Topeka
 Mollie Manerva Smith Moser (HE);
 Westphalia
 Harry Allyson Moore (IJ); Manhattan
 Manoog Muguerditch Muguerditch (Ag);
 Manhattan
 Edith Mabel Muir (HE); Salina
 Joseph Linn Mullen (Ag); Clay Center
 Arthur Leroy Myers (Ag); Windom
 Clifford Howard Myers (ME); Hutchinson
 Jesse Bowman Myers (Ag); Milton
 Elinor Frances Neal (HE); Topeka
 Laura Edna Shingledecker Neale (IJ);
 Manhattan
 Philip Earl Neale (Ag); Manhattan
 Harry Hibbard Nelson (Ag); Wakarusa
 Ralph Dale Nichols (Ag); Scranton
 Floyd Earl Oakes (Ag); Gypsum
 Glenn William Oliver (Ag); Howard
 Edlena O'Neil (HE); Quindaro
 Nellie Maria Payne (GS); Manhattan
 Nevels Pearson (Ag); Manhattan
 Frederick John Peters (Ag);
 Oak Harbor, Ohio
 Benjamin Rankin Petrie (Ag); Pratt
 Helen Margaret Boyd Petrie (GS); Pratt
 Telford Ruddell Pharr (Ag); Manhattan
 Hervey Phipps (VM); Pueblo, Colo.
 Leo Dewey Ptacek (Ag); Emporia
 Edna Winifred Pyle (HE); Morrill
 Arthur Cecil Ramsey (GS); Osage City
 Phoebe Frances Rebstock (HE); Newton
 Lyman Jay Rees (CE); Talmage
 Winfield John Ritter (VM); Parsons
 Lloyd William Roberts (CE); Pomona
 Ada LaVerne Robertson (HE); Washington
 William Ellet Robison (Ag); Towanda
 Carl Otto Roda (Ag); Paradise
 Cleo Prudence Roderick (HE); Attica
 Walter William Rodewald (Ag); Vassar
 Amanda Christina Rosenquist (HE);
 Osage City
 Lenora Olive Rude (GS); Manhattan
 Winfield Foster Runyen (Ag); Topeka
 Guy Allegra Russell (CE); Lakin
 Frank Louis Sahlmann (EE); Lincoln
 Blanche Martha Sappenfield (GS);
 Clifton
 Jewell Dan Sappenfield (GS); Clifton
 Luella Mabel Clara Schaumburg (Ag);
 La Crosse
 Merrill Philip Schlaegel (VM); Vermillion
 Eliza Lucretia Scholer (HE); Milo
 Ira John Shoup (Ag); Udall
 Grover Meeker Simpson (VM); Salina
 Marjory Hannah Simpson (HE);
 Nowata, Okla.
 Louis Vallieres Skidmore (VM);
 Manhattan
 Caroline Elizabeth Sloop (IJ); Manhattan
 Grace King Smith (HE); LeRoy
 James Campbell Snapp (Ag); Manhattan
 Martin Hayden Soule (EE); Independence
 Jay Erskine Stanton (VM); Manhattan
 Oscar Steanson (Ag); Oklahoma City, Okla.
 Christine Stebbins (HE); Columbus
 Velda Elizabeth Stewart (HE); Morganville
 Ella Belle Stinson (HE); Kansas City
 Roscoe Noyes St. John (ME);
 Rocky Ford, Colo.
 Josephine Sullivan (HE); Wamego
 Theodore Thomas Swenson (Ag); Lindsborg
 Charles Swingle (Ag); Manhattan
 Brainard Louis Taylor (VM);
 Arkansas City
 Earl Hicks Teagarden (Ag); Wayne
 Leona Emma Teichgraeber (HE);
 Lindsborg
 Donald Cheney Thayer (Ag); Manhattan
 Marie Laura Thomas (HE); Auburn, Ind.
 Kyle David Thompson (Ag); Densmore
 Francis Totten (Ag); Beattie
 Carl Fenton Trace (Ag); Cartersville, Mo.
 Mabel Troutfetter (GS); Colby
 Yuk En Tseu (IG); Honolulu, Hawaii
 William Tully Turnbull (GS); Manhattan
 William Ira Turner (Ag); Milton
 Mark Florea Upson (Ag); Sabinal, Tex.
 Perttu Hannes Virtanen (Ag); Butte, Mont.
 Edith Grace Wakefield (HE); Culver
 Arthur Joseph Walker (GS); Manhattan
 Albert Neal Waters (Ag); Blue Rapids
 Sheppard Arthur Watson (Ag); Eudora
 Merrill Worthing Watt (Ag); Topeka
 Loverne Webb (HE); Cedar Vale
 Francis George Welch (Ag); Hartford
 Willard Welsh (Ag); Newton
 Bula Mae Wertenberger (HE);
 Manhattan
 Edith Marie Wheatley (GS); Rosedale
 Elizabeth Whetstone (HE); Pomona
 Brenner Bagnall White (VM); Delphos
 Ivan Alfred White (Ag); Winfield
 Emma Whitton (GS); Kiowa
 Andrew Wilber Wilcox (GS); Manhattan
 Marshall Parrish Wilder (IJ); Douglass
 Alma Luella Wilkin (HE); Aulne
 Edna May Wilkin (HE); Aulne
 Faye Williams (HE); Gardner
 Homer Bryan Willis (Ag); Manhattan
 Harberd Stephen Wise (Ag); Wichita
 Homer Carlton Wood (Ag); Manhattan
 Harold Stephen Woodard (Ag); Glen Elder
 Maude Ellen Carter Woods (HE);
 Tonganoxie
 Theodore Franklin Yost (Ag); La Crosse
 Fay Aileen Young (HE); Le Roy
 Fred Frank Young (Ag); Pendennis
 Philip Hsun Young (Ag);
 Hangchow, China

JUNIORS

- Earl Abbott (EE); Garden City
 Gladys Virginia Addy (HE); Manhattan
 Cora Barbara Akers (HE); Conway
 George Clarence Anderson (Ag); Bronson
 Jennie Anderson (HE); Muskogee, Okla.
 Esther Etta Andrews (HE); Manhattan
 Ardis Corinne Atkins (HE); Manhattan
 Ray Allen Axtell (Ag); Dimmitt, Tex.
 Charlotte Hosier Ayers (HE); La Harpe
 Harriett May Baker (GS); Emporia
 Lowell Edwin Baldwin (EE); Garnett
 Florence Banker (HE); Lawrence
 Paul Willis Barber (GS); Bluff City
 Ida May Bare (HE); Protection
 Edgar Hugh Barger (VM); Smith Center
 *Philip Asa Barnes (Ag); Blue Mound

° Deceased

* Under auspices of Federal Board for Vocational Education.

JUNIORS—continued.

- Harold Winthrop Batchelor (GS);
Manhattan
- Louis Bloyce Bate (VM); Wichita
- Thomas Baumgartner (Ag); Manhattan
- Ernest Leo Bebb (EE); Reading
- Lindley Charles Binford (GS); Haviland
- Joseph Alvin Bogue (VM); Manhattan
- Cecil Lloyd Bower (CE); Mound City
- Fred William Boyd (Ag); Joplin, Mo.
- Martin D. Brechbill (GS); Ramona
- Roy Shipman Breese (EE); Manhattan
- *Arthur Hays Brewer (CE); Manhattan
- Duke Daniel Brown (Ag); Marysville
- Elsa Ann Brown (HE); Manhattan
- Guy Mahlon Brown (ME); Manhattan
- John Farr Brown (Ag); Toronto
- Albert Joseph Brubaker (ME); Ellsworth
- Gladys Elizabeth Bushong (GS);
Manhattan
- Rex Dean Bushong (VM); Manhattan
- Jamie Irene Cameron (HE); Manhattan
- Samuel David Capper (Ag); Ames
- Walter Bryan Carey (GS); Hutchinson
- Ida Pearl Carr (HE); Anthony
- Gladys Beatrice Carson (HE); Liberal
- Hortense Caton (HE); Winfield
- Benjamin Finley Clapham (VM); Lane
- Ercile LaVeta Clark (GS); Hutchinson
- Marian Cecile Clarke (GS); Paola
- Robert Earl Cleland (Ag); Manhattan
- Sylvester Jay Coe (Ag);
St. Augustine, Fla.
- Sylvan Harold Coffman (Ag); Chase
- Bessie Olive Cole (HE); Kinsley
- Arthur Bright Collom (GS); Maressa, Ill.
- Carl Marcus Conrad (AC); Elk City
- Gertrude Vivian Conroy (IE); Manhattan
- Arthur Everett Cook (Ag); Russell
- Christine Carol Cool (HE); Plainville
- Robert Francis Copple (Ag); Glasco
- Nora Corbet (HE); Leona
- Hubert James Counsell (EE); Garden City
- Marceline Willard Couture (HE); Topeka
- Everett Russell Cowell (Ag); Clay Center
- Judith Rae Briggs Craig (HE);
Hope, Ark.
- Royce Brainerd Crimmin (FME);
Bradford, Mass.
- Ruby Louise Crocker (IJ); Matfield Green
- Mary Natalie Cruzan (GS); Gallatin, Mo.
- Oscar Cullen (ME); Lebanon
- Dorsie Lawrence Deniston (Ag);
Stafford
- Abbie Clair Dennen (HE); Manhattan
- Addison Curtis DePuy (ME); Manhattan
- Walt Ellwood Dickerson (CE); Wichita
- Alexey Euguenievich Dobrohotov (Ag);
Viazniki, Russia
- Claire Ansel Downing (IC); Wichita
- Vinnie Drake (HE); Manhattan
- George Milton Drumm (Ag); Manhattan
- Myers Duphorne (EE); Sharon Springs
- Linn Edmund Eberwein (Ag); Lawrence
- Roy Frederick Eckart (ME); Paola
- Edwin Elcock (CE); Wichita
- Fred Emerson (VM); Ottawa
- Jessie Belle Evans (GS); Goodland
- Bly Ewalt (HE); Medicine Lodge
- Ethel Feese (GS); Pratt
- Ray Ferree (Ag); Yates Center
- Howard Daniel Finch (Ag); White Water
- George Wilber Fisher (EE); Sedalia, Mo.
- Otto Franklin Fisher (ME); Sedalia, Mo.
- Torby Glenn Fletcher (FME); Wichita
- Elsie Gladys Flippo (HE); Abilene
- Conie Caroline Foote (HE); Downs
- Gladys Evelyn Ford (HE); Seneca
- John Fredenberg (VM); Council Grove
- Dewey Mason Fullington (ME); Idana
- Clifford Gallagher (VM); Perth
- Ruth Emma Gardenhire (HE); Alma
- Oscar Deane Gardner (EE); Louisburg
- Henry Gilbert Gentry (Ag); Winfield
- William Hopper Getty (Ag); Downs
- Ernest Eugene Gilbert (Ar); Manhattan
- Mary Helen Gilbert (HE); Manhattan
- Ruth Harriet Gilles (HE); Kansas City
- Howard Lewis Gingery (VM);
Pawnee City, Neb.
- George Albert Gingrich (Ag); Wakefield
- Mable Celesta Ginter (HE); Manhattan
- Geneva Goddard (HE); Dunavant
- Fannie Harriet Gorton (HE); Manhattan
- Irene Florence Graham (HE); Manhattan
- Chester Eugene Graves (Ag); Wellsville
- Hannah Elizabeth Greenlee (HE);
Kansas City
- Hilborn Hall Groat (VM); Silver Lake
- Garnet Vivean Grover (HE); Iola
- Bertha May Gwin (HE); Washington
- Fred Lynn Hall (EE); Alma
- Marguerite Frances Hammerly (GS);
Manhattan
- *Frank Hare (VM); Dawn, Mo.
- Ruth Garfield Harrison (HE);
Jewell City
- Lucile Clara Hartman (HE); Hutchinson
- Ethel Porter Hatfield (GS); Wichita
- Charles Marion Haughton (CE); Wichita
- Joseph Elbert Helt (EE); Winfield
- *Clyde Russell Hemphill (Ag); Chanute
- Margaret Effie Hendricks (HE);
Fort Smith, Ark.
- Homer Henney (Ag); Horton
- Ethan Allen Herr (Ag); Medicine Lodge
- Chester Alberrn Herrick (Ag); Manhattan
- Grace Hibarger (GS); Wichita
- Russell Dean Hilliard (EE); Westmoreland
- George Winfred Hinds (Ag); Manhattan
- Frank Hoath (Ag); Anthony
- Glenn Oscar Hoffhines (Ag); Marquette
- Edna Letha Hoke (HE); Manhattan
- Dalton Roy Hooton (Ag); Garnett
- William Harold Hoots (Ag); Winfield
- Nellie Marie Hord (HE); Colony
- Opal Maye Horr (GS); Thayer
- Clara Belle Howard (HE); Colby
- Oliver Howells (Ar); Rosedale
- Fred Harold Hull (Ag); Portis
- Bruce Charles Hutchins (ME); Ellsworth
- Dan Leo Jantz (AE); Larned
- Jerry Dillard Jarmon (VM); Coffeyville
- Edward John Jelden (VM);
Columbus, Neb.
- Hope Forrester Jenkins (EE); Kingman
- George Scott Jennings (Ag); Winfield
- *Francis Jordan (Ag); Manhattan
- Clifford Frederick Joss (EE); Topeka
- Everett Barton Kain (Ag);
Rocky Ford, Colo.
- Walter August Karlowski (IJ);
Sylvan Grove
- Madge Elizabeth Kasten (HE); Colby
- Mildred Kaucher (HE); St. Joseph, Mo.
- Elithe Electa Kaull (GS); Glen Elder
- George Lowell Kelley (Ag); White Cloud
- Ray Edwin Kellogg (FME); Wichita
- Foley Kiang (Ag); Hangechow, China
- Harriette Louise Klaver (HE); Kingman
- Russell Vernon Knapp (ME); Norton
- Violet Virginia Knaus (GS); McPherson
- Clifford Kniseley (GS); El Dorado
- William Henry Knostman (GS); Wamego
- Raymond Scott Knox (EE); Jetmore
- Carl Albert Kreth (Ag); Onaga
- *Ernest Lester Lahr (Ag); Abilene

* Under auspices of Federal Board for Vocational Education.

JUNIORS—concluded.

- Maude Ella Lahr (GS); Waynoka, Okla.
 Ira Kaul Landon (Ag);
 Oklahoma City, Okla.
 Homer Waldo Larson (ME); Manhattan
 Walter Frank Law (IJ); Sheridan, Ark.
 Blanche Lea (IJ); Greensburg
 George Wesley Leeson (GS); Council Grove
 Ione Elizabeth Leith (IJ); Irving
 Merle James Lucas (EE); Pratt
 Geta Lund (IJ); Manhattan
 Norman Dale Lund (CE); Protection
 Norman LeRoy Lupton (Ag); Sterling
 Robert Henry Lush (Ag); Altamont
 Eugene Sidney Lyons (Ag); Lawrence
 Rollo Wade McCall (Ag); Brewster
 Clarence Hewitt McCandless (EE);
 Cottonwood Falls
 Ross McCausland (GS); Wichita
 Herbert William McClelland (GS);
 Manhattan
 Elmer David McCollom (Ag);
 Bogard, Mo.
 Dewey Zollie McCormick (Ag); Zeandale
 Helen McNeal (HE); Joplin, Mo.
 Franz Joseph Maas (ME); Alta Vista
 Geneve Madden (HE); Horton
 Paul Christoph Mangelsdorf (Ag);
 Atchison
 Carl Marrs (EE); Bradford
 Florence Ethel Mather (HE); Manhattan
 Hilery Edwin Mather (Ag); Manhattan
 Rex Arthur Maupin (Ag); St. Joseph, Mo.
 Raymond Ellsworth Means (CE); Protection
 Carl Franklin Mershon (Ar); Oakley
 Albert Metz (Ag); Anthony
 Tressie Edna May Middleton (HE);
 Manhattan
 Marguerite Helen Miller (HE); Salina
 Marshall Miller (EE); Manhattan
 Helen Amy Mitchell (HE); Salina
 Clinton Hawthorne Morgan (Ag); Hays
 Leonard Glenn Morgan (VM); Manhattan
 Mollie Morton (IJ); Ellsworth
 Dorothy Moseley (HE); Alma
 Donald Joseph Mosshart (ME); Manhattan
 James Herbert Moyer (Ag); Hiawatha
 Barbara Elizabeth Murray (HE);
 Ash Grove, Mo.
 Marianne Muse (HE); Manhattan
 Alice Helen Mustard (HE); Manchester
 Anna Belle Neal (GS); Topeka
 Helen Isabel Neiman (HE); White Water
 *Clegg Ansel Newell (Ag); Matfield Green
 Charles Nitcher (Ag); Hardy, Neb.
 Hans Christian Olsen (GS); Farwell, Neb.
 Gerda Pauline Olson (HE); Wichita
 Ruby Elizabeth Orth (GS); Manhattan
 Reeves Ayers Osborne (Ag); Burrton
 Merton Louis Otto (Ag); Riley
 Clementine Paddleford (IJ); Manhattan
 John Hale Parker (Ag); Ottawa
 Ellen La Verne Pennel (HE);
 Oregon, Mo.
 Thomas Gilbert Perry (VM); Wichita
 Orin Ross Peterson (Ag); Caney
 John Kent Pike (EE); Chanute
 Faye Marie Powell (HE); Iola
 Elva Mae Price (HE); Baileyville
 James Wendle Pryor (ME); Kansas City
 Clarence Benedict Quigley (Ag); Blaine
 Velva Rader (HE); Caney
 Roland Culler Ragle (CE); Coffeyville
 Helen Gertrude Ramsey (HE); St. Francis
 Laurens Hawn Reyburn (Ag);
 Leavenworth
 Henry Irving Richards (Ag); Howard
 Gladys Irene Ritts (HE); Topeka
 Kathryn Roderick (HE); Emporia
 Lydia Eugenia Rogers (BC); Goodwell, Okla.
 Ethel Caroline Roop (HE); Wakefield
 Warren Earl Rothweiler (EE); Bison
 Charlotte Frances Russell (IJ); Winfield
 Esther Arrilla Russell (HE); Stafford
 Marion Elizaeth Sanders (HE);
 Leavenworth
 Chauncey Elias Sawyer (VM); Carlyle
 Abraham Burton Schmidt (AE); Canton
 Lee Ashton Scott (VM); Westphalia
 Myra Edna Scott (GS); Manhattan
 Flavel Theodora Scriven (EE); Lucas
 William Dennis Scully (ME); Belvue
 Marcia Anna Seeber (GS); Great Bend
 Ursula Susie Senn (HE); Lasita
 Guy Shelley (CE); Wichita
 Harry Kenneth Shidler (CE); Girard
 Robert Shoffner (AE); Kipp
 David Loyd Signor (Ag); Manhattan
 Paul Louis Sites (CE); Phillipsburg
 Hortense Slavens (HE); Neosho Falls
 Helen Virginia Sloan (HE); Independence
 Clara Mary Smith (HE); Mound City, Mo.
 Clayton Needham Smith (Ag);
 Pawhuska, Okla.
 Samuel Smith (Ag); Florence
 Samuel Ross Smith (Ag); Fort Riley
 Nathaniel Sheridan Spangler (Ag);
 Abilene
 Harold Marshall Spiker (Ag); Emporia
 George Elmer Starkey (Ag); Syracuse
 Mildred Sterling (HE); Clay Center
 William Thomas Sterling (Ag); Herington
 Elma Ruth Stewart (HE); Topeka
 Lillian Colene Stewart (HE);
 Hamilton, Mo.
 Morton Stigers (EE); Manhattan
 Charles Harold Stinson (Ag); Carlyle
 Thomas Granville Storey (EE); Freeport
 Mabel Mangehild Swanson (HE);
 Manhattan
 Florence Mathilda Swenson (HE);
 Kansas City, Mo.
 Joseph Eugene Thackrey (GS);
 Valentine, Neb.
 Corinne Bertha Thiele (GS); Hanover
 Charles Albert Thresher (Ag); Jetmore
 John Edward Tillotson (IJ); Manhattan
 Everett Tunnichiff (VM); Rawlings, Wyo.
 Grace Leoti Turner (GS); Milton
 Wright Edmund Turner (Ag); Iola
 Ethel Grace Van Gilder (HE);
 Manhattan
 Loren Gilbert Van Zile (GS); Manhattan
 Ray Bates Watson (Ag); Wichita
 Arthur Weber (Ag); Horton
 Norine Ardeth Weddle (GS); Lindsborg
 Sara Esther Weide (HE); Yates Center
 Ray Weinheimer (VM); Ottawa
 Lucile Whan (IJ); Manhattan
 Raymond Francis White (Ag); Winfield
 Frances Josephine Whitmire (HE);
 West Plains, Mo.
 Jennings Elliott Williams (VM);
 Windsor, Mo.
 Marion Manning Williams (VM); Muscotah
 Ruth Evalyn Willis (HE); Manhattan
 John Cathcart Wilson (GS); Manhattan
 Paul Benjamin Winchel (EE); Parker
 Cora Winget (HE); Jennings
 Elizabeth McNew Winter (HE);
 Gainsville, Tex.
 Lee Winter (GS); Lecompton
 Elsie Wolfenbarger (HE); Winkler
 Lois Wood (HE); Emporia
 Margaret Woodman (IJ); Manhattan
 Warren Mudgette Woodman (Ag);
 Vermillion
 Floyd Wayne Work (EE); Windom
 Esther Wright (HE); Welsh, La.
 Clemens Harry Young (Ag); Manhattan
 Susan Elizabeth Young (HE); Jewell
 Clarence Le Roy Zimmerman (EE);
 Olathe
 Lloyd Zimmerman (EE); Lockney, Tex.

SOPHOMORES

- Edith Dorothy Abbott (IJ); Manhattan
 Kathryn Ruth Adams (HE); Manhattan
 *James Frederick Adece (VM); Manhattan
 Jessie Gertrude Adece (HE); Wells
 Clarence Eugene Agnew (Ag); Yates Center
 John Akers (Ag); Conway
 James Henry Albright (GS); Winfield
 Dale Allen (ME); Burlington
 Jesse Levi Allen (Ag); Norwich
 Joseph Levi Allen (Ag); Leavenworth
 Fern Catherine Allison (GS); Kinsley
 Helen Rose Anderson (GS); Thayer
 Nelson Henry Anderson (Ag); Neosho Falls
 Georgia Fern Andrews (HE); Wichita
 Paul McKee Anthony (EE); Westmoreland
 Willard Armstrong (GS); Larned
 William Allen Atchison (Ag); Topeka
 Aldis Lynn Austin (Ag); Irving
 Florence Adelaide Austin (HE); El Dorado
 Oscar Hugh Aydelotte (EE); Manhattan
 Lillian Edna Ayers (GS); La Harpe
 Vida Mildred Ayers (HE); Sabetha
 Mildred Mae Baer (HE); Wichita
 Edgar Francis Bailey (EE); Pratt
 Harold Theodore Baker (AE); Tonganoxie
 Herbert Bales (Ag); Manhattan
 Marion Henry Banks (ME); Wichita
 Justus Wheeler Barger (Ag); Newkirk, Okla.
 Helen Mildred Barnett (HE); Denison
 Burton Bernard Bayles (Ag); Clay Center
 Hazel Reba Beeks (HE); Geuda Springs
 Winifred Margaret Bell (HE); Kinsley
 Marjorie Marie Berger (GS); Sylvan Grove
 Joseph Ersal Beyer (EE); Mooreland, Okla.
 Ivaloo Elizabeth Bickel (HE); Barnes
 Florence Arnold Bingham (GS); Junction City
 Rose May Blackwelder (HE); Isabel
 William Blakely (Ag); Neodesha
 Daniel Blanchard (GS); Manhattan
 Gladys Emelia Bollinger (HE); Everest
 Marguerite Mildred Bondurant (HE); Ness City
 Curtis Clegg Bost (Ag); Matthews, N. C.
 Walter Raymond Bradley (EE); Kidder, Mo.
 William Elwood Brandt (ME); McPherson
 Marian Elizabeth Brookover (HE); Eureka
 Awilda Brown (HE); Winfield
 Henry Lane Brown (CE); Blue Rapids
 Paul Shannon Brown (Ag); Holton
 Orville Kenneth Brubaker (EE); McPherson
 Neal Dwight Bruce (Ar); Marquette
 Frances Elizabeth Brumbaugh (HE); Vesper
 Homer Griffin Bryson (IJ); Leon
 John William Bucklee (EE); Manhattan
 Robert Lee Bumgardner (CE); Arkansas City
 Holman Lynn Bunger (Ag); Wheat Ridge, Colo.
 Leslie Burger (HE); Seneca
 William Harold Burgwin (CE); El Dorado
 Bertha Anna Burk (HE); Clifton
 Earl Frederick Burk (Ag); Ottawa
 Hartzell Burton (Ag); Wichita
 George Hoffman Bush (EE); Little River
 Georgianna Bush (HE); Little River
 Elvira Josephine Bussey (IJ); Muscotah
 Oliver Pardee Butler (Ag); Farmington
 Lawrence Byers (Ar); Abilene
 Helen Marie Calkins (HE); Burlingame
 Myrtle Louise Camp (HE); Manhattan
 Zattie Otellia Carp (GS); Wichita
 George Dale Carson (CE); Gerlaw, Ill.
 Frances Casto (GS); Guymon, Okla.
 Marian Chandler (HE); Wichita
 DeLoss Chapin (Ag); Manhattan
 Edna Chapin (GS); Manhattan
 Robert Leslie Chapman (EE); Paola
 Volney Allan Chase (Ar); Manhattan
 Ray Samuel Circle (Ag); Kiowa
 Leo Melvin Clark (Ar); Chapman
 Nita Rose Clark (HE); Wichita
 Roy Engle Clegg (Ag); Altoona
 Fred Cocherell (EE); Manhattan
 Embert Harvey Coles (Ag); Seneca
 Howard Loyd Comfort (Ag); Cawker City
 Harry Hubert Connell (CE); Bazine
 Velma Bertha Conner (HE); Blue Mound
 Frank Raymond Cooper (EE); Clearwater
 Helen Lucille Cooper (HE); Clearwater
 Samuel Lynn Copeland (Ag); Hutchinson
 Georgia Belle Crihfield (HE); Geneseo
 Anna Marie Crocker (IJ); Matfield Green
 Rolland Miller Crow (EE); Kansas City
 John Daniel Cunningham (GS); Manhattan
 Ruth Lois Cunningham (HE); Manhattan
 Esther Curtis (HE); Kansas City
 George Stuart Davis (CE); Clay Center
 Rowland Leeds Dennen (GS); Seneca
 Carl Emerson Depue (Ag); Parker
 Carl Curt Dethloff (Ag); Kansas City, Mo.
 Elizabeth Dickens (IJ); Manhattan
 Fred Hollister Dodge (Ag); Manhattan
 Earl Ralph Domoney (EE); Downs
 Irene Dora Drake (HE); Wichita
 Lester Henry Drayer (ME); Manhattan
 Margaret Dubbs (HE); Ransom
 Gerald Stone Durlinger (GS); Burrton
 Charles Sylvester Ebenstein (EE); Manhattan
 Harold Chester Elder (ME); Mankato
 Richmond Knostman Elliott (EE); Manhattan
 Eleanor Dryden Encell (HE); Howard
 Arnold Joseph Englund (Ag); Falun
 Victor John Englund (CE); Falun
 Elmer Rowland Enns (EE); Inman
 Clara Bernice Evans (HE); Liberal
 John Evans (Ag); Osage City
 Kenneth Clyde Farley (VM); Natchitoches, La.
 Frank Leonard Fellingham (ME); Peabody
 Carl Field (GS); McPherson
 Glenn Erving Findley (Ag); Manhattan
 Marjorie Fisher (GS); Manhattan
 Gertrude Evelyn Flowers (HE); Hastings, Neb.
 Paul Alfred Foltz (EE); Waco, Tex.
 Asa Herbert Ford (EE); Seneca
 Karl Frank (EE); Manhattan
 Ella Amy Franz (HE); Rozel
 Chester Metcalf Freeland (Ag); Logan, N. Mex.
 Ethel Mary Freeland (GS); Horton
 Elsie Fulton (HE); El Dorado
 Elton Milbert Gard (AE); Stafford
 Grace Lillian Gardner (HE); Hutchinson
 Truman Olvord Garinger (Ag); Admire
 Gerald Lynn Garlock (EE); Garden City
 Harold David Garver (Ag); Abilene
 Ruth Reynolds Garvin (HE); Lawrence
 Harold Paul Gaston (ME); Pratt
 David Martin Geeslin (EE); Arkansas City
 Glen Earnest Gates (CE); Kansas City
 Samuel James Gilbert (Ag); Arkansas City
 Robert Kenneth Girard (IJ); Windom

SOPHOMORES—continued.

- George McGrew Glendening (EE);
 Circleville
 William Glenn, jr. (Ag); Manhattan
 Arthur Asher Graves (Ar); Manhattan
 Earl Francis Graves (Ag); Manhattan
 Hazel Louise Graves (HE); Manhattan
 Theodore Reed Griest (Ar); Topeka
 Ward Clarke Griffing (Ag); Manhattan
 Willis Goodrich Griffing (Ag); Manhattan
 Evan Lawrence Griffith (GS); Manhattan
 Lillian Velma Grubb (HE); Wetmore
 Edith Gay Grundmeier (HE); Barnard
 Clinton DeWitt Guy (Ag); Kansas City, Mo.
 Joseph Edward Haag (EE); Holton
 Frances Wilma Haegert (HE); Randall
 Belle Hagans (GS); Manhattan
 Mildred Josephine Halstead (HE);
 Manhattan
 Isabell Hamilton (HE); Hastings, Neb.
 Robert Leslie Hamilton (ME);
 Fort Worth, Tex.
 Agnes Handlin (GS); Manhattan
 Walter Roy Harder (Ag); Minneapolis
 Gilbert Virgil Harper (GS); Calista
 Jane Gladys Hartley (GS); Manhattan
 Ernest Hartman (GS); Raymond
 Clarence Raymond Hatfield (CE); Wichita
 Grace Headrick (HE); Winfield
 Herbert Benjamin Headrick (ME);
 Winfield
 George Granville Hedrick (Ag); Gardner
 Loren Bryce Hefling (ME); Burrton
 Norman Wolf Heim (GS); Ellinwood
 Fred John Hennes (EE); Burns
 Emra Adam Hepler (Ag); Manhattan
 Perry Joseph Hershey (EE); White Water
 Jack Hill (Ag); Leocompton
 Herman George Hockman (EE); Beattie
 Ernest Eugene Hodgson (Ag); Harveyville
 Emil Hokanson (CE); Marquette
 Glenn Henry Hollister (CE); Manhattan
 Cecil Canum Holmes (Ag); Wellington
 Richard Hopper (ME); Manhattan
 Kenneth Oscar Howard (EE); Wichita
 Agnes Howard (HE); Winona
 Angie Howard (HE); Colby
 Harvey Earle Howard (Ar); Manhattan
 Mable Amanda Howard (HE); Manhattan
 Charles Harold Howe (GS); Chapman
 Charles Willard Howe (Ag); Garrison
 May Agnes Hunter (HE); Rock Creek
 Mattie Christine Jackson (HE);
 Kansas City
 Gard Thomas James (Ag); Lane
 Guy Herndon James (CE); El Dorado
 Ralph St. Clair Jennings (EE); Le Roy
 Florence Marguerite Johnson (GS);
 Manhattan
 Merrill Nelson Johnson (Ag); Phillipsburg
 Tracy Ebbert Johntz (ME); Abilene
 Jessie Agnes Jones (HE); Osawatimie
 Omer Karns (CE); Fort Scott
 Clarice Mildred Kendall (HE); Ottawa
 John Harold Kerr (Ag); Kinsley
 Kathleen Knittle (GS); Manhattan
 Carol Knostman (HE); Wamego
 William Harold Koenig (Ar); Nortonville
 Ira Mayra Kopp (HE); Hiawatha
 Paul Kovar (EE); Kansas City, Mo.
 Emmett Engle Kraybill (Ar); Abilene
 Herbert Henry Krehbiel (Ag); Moundridge
 Maurice Dee Laine (IJ); Herington
 Ralph Cole Lapsley (GS); Burlington
 Wing Kei Lau (Ag); Hongkong, China
 Lysle Douglas Leach (Ag); Winfield
 Aubrey Mac Lee (VM); Manhattan
 Vera Louise Lee (HE); Glen Elder
 LeRoy Markel Leiter (CE); Protection
 Eva Bell Leland (HE); Wichita
 Ira William Lewis (GS); Downs
 William David Lobaugh (Ag); Greenleaf
 Madeline Maxine Locke (HE); Erie
 Glen McCrea Longley (CE); Lebanon
 Samuel Patterson Lyle (Ag); Manhattan
 Daniel Gail Lynch (ME); Manhattan
 Winfred Owen McCarty (Ag); Ames
 Henrietta Vera McClelland (HE);
 Manhattan
 Harold Joseph McGinley (Ag);
 Rogers, Ark.
 Elza Virginia McGraw (HE); Lebo
 Chester George McKee (ME);
 Minneapolis
 Harold Theodore McKeever (Ag);
 Circleville
 James Alexander McKitterick (VM);
 Greenwood, Mo.
 Paul Marquios McKown (EE); Manhattan
 Charles Clyde McPherson (EE); Iola
 Katherine Cardwell McQuillan (HE);
 Clifton
 Joseph Taylor Mackay (Ag);
 Kansas City, Mo.
 Ross James Maltby (Ar); Salina
 Louise Helen Mangelsdorf (HE); Atchison
 Thornton Jason Manry (EE); Lucas
 Ray Eugene Marshall (Ag); Manhattan
 Helen Martin (GS); Milan
 Paul Gordon Martin (CE); Junction City
 William Luther Martin (Ag); Winfield
 Rolland Sylvester Mather (Ag); Manhattan
 Ezra Perle Mauk (Ag); Manhattan
 Orpha Maust (GS); Garden City
 Hobart Irwin May (ME); Manhattan
 Albert Vincent Mead (IJ); Manhattan
 Earl Thomas Means (Ag); Everest
 Dorris Lu Verne Mell (HE); Wetmore
 Grace Merrilat (GS); Enterprise
 Arthur Leroy Meserve (CE); Ellis
 Roy Lee Meyer (Ag); Anthony
 Bernice Ellen Miller (HE); Horton
 Edith Pearl Miller (HE); Council Grove
 William Cloud Mills (Ag); Lake City
 Alice Brady Mitchell (IJ); Kansas City, Mo.
 Halford Ernest Moody (Ag); Riley
 Cecil Moore (IC); Manhattan
 John Morrison Moore (Ag); Stockton
 Raymond Hubert Moran (GS); Clifton
 Charles Francis Morris (EE); Wichita
 Luella Lucille Morris (HE); Wichita
 Ross Davis Mowry (ME); Manhattan
 Jephtha Jerry Moxley (Ag); Osage City
 Edmond John Mueller (EE); Washington
 Donald Dudley Murphy (Ag); Halstead
 Guy Archibald Murray (CE); Nekoma
 Harold Smith Nay (ME); Manhattan
 Arria French Neal (HE); Clay Center
 Thomas Neely (Ag); Abilene
 Harry Emery Newton (Ag); Winfield
 Raymond Clyde Nichols (IJ); Buffalo
 Frank Edward Nordeen (EE); Dwight
 Guy Oden (ME); Sterling
 Hazel Lucille Olson (HE); Topeka
 Randolph Lindly Palmer (IJ); Jewell
 Amos Oliver Payne (ME); Manhattan
 Ruth Jane Peck (GS); Berryton
 Parks Brinkley Pedrick (Ag);
 New Orleans, La.
 Florence Utele Persons (GS); Manhattan
 Gladys Irene Peterson (IJ); Hutchinson
 Paul John Phillips (EE); Paola
 Phil Delbert Piatt (Ag); Hamilton

SOPHOMORES—concluded.

- Robert Bryden Piatt (Ag); Hamilton
 William Dale Pierce (EE); Concordia
 Raymond Plyley (Ar); Scranton
 Charles Wallace Pratt (IJ); Wiggins, Mo.
 Hally Ralph Priestley (CE);
 Mutual, Okla.
 Michael Ptacek (Ag); Emporia
 Elsie Inez Puckey (HE); Clay Center
 Arthur William Quinlan (EE); Lyons
 Karl Quisenberry (Ag); Newton
 Helen Louise Rabe (HE); Axtell
 Jean Merrill Ragle (GS); Coffeyville
 Horace Malvern Randels (Ag); Anthony
 Floyd Ratts (VM); Atlanta
 George Harvey Reazin (EE); Manhattan
 Marion Capps Reed (GS); Manhattan
 Oliver Reed (Ag); Manhattan
 Hattie Elizabeth Reynolds (HE);
 Kansas City
 John Calvin Riddell (EE); Salina
 Louis Rudolph Ritter (Ag);
 Jonesboro, Ark.
 Carson Basil Roberts (Ag); Webb City, Mo.
 LeRoy Emerson Robinson (IJ); Cassoday
 William Chain Robison (Ag); Towanda
 Walter John Rogers (FME); Salina
 Walter Thomas Rolfe (Ar); Wetmore
 Martie Elizabeth Rone (HE);
 Elk City, Okla.
 Paul McKinley Roote (GS); Eskridge
 Pearl Rorabaugh (GS); Lebanon
 Lee Russell (EE); Meade
 Irvin Thomas Rothrock (GS);
 Johnson, Ark.
 Fred Forsythe Russell (Ag); Paola
 Mildred Minnie Rust (HE); Washington
 Morse Henderson Salisbury (IJ);
 El Dorado
 William Sartorius (ME); Garden City
 George Russell Schroll (Ag); Syracuse
 Dale Schwartz (Ag); Winkler
 Gladys Annette Scott (HE); Topeka
 Madge Marian Scott (HE); Kansas City
 Lester Ralph Sellers (ME); Great Bend
 James Jacob Seright (EE); Lucas
 Dorothy David Settle (HE); Rosedale
 Paul Morse Shaler (AE); Topeka
 Clare Liggett Shellenberger (Ag);
 Manhattan
 Luella Pearl Sherman (HE); Grinnell
 Mac Short (ME); Salina
 Ross Jacob Silkett (Ag); Downs
 Verne Franklin Simons (IC); Howard
 Ralph Edgar Simonson (VM);
 Danbury, Neb.
 Samuel Arnold Simpson (GS); Salina
 Harry Edwin Skoog (Ag); Corbin
 George Sherman Smith (ME);
 Independence
 Linas Burr Smith (Ar); Hutchinson
 Marion Ashton Smith (Ag); Topeka
 Rollin James Smith (ME); Topeka
 Fletcher Speck (Ag); Kansas City
 Harold Crane Spencer (IJ); La Harpe
 Jay Ralph Starkey (VM); Manhattan
 Florence Stauffer (HE); Manhattan
 James Scott Stewart (Ag); Coldwater
 Warren Roy Stewart (Ag); Manhattan
 Ross William Stice (Ag); Alta Vista
 Marguerite Marie Stotts (HE);
 Diller, Neb.
 Henry Clinton Sturgeon (Ag); Lane
 Abbie Swafford (HE); Manhattan
 Frank Arvid Swanson (Ag); Manhattan
 Eugene Rupert Sweet (Ag); Manhattan
 Harold Irwin Tarpley (EE); Kansas City
 George Emery Taylor (Ag); Manhattan
 Burdette Tegmeier (GS); Manhattan
 Helen Thayer (GS); Manhattan
 Adolphus Johnson Thomas (GS);
 Silver Lake
 Earl Emery Thomas (CE); Argonia
 Rowena Malinda Thornburg (GS);
 Formoso
 Hall Henderson Thornburgh (Ag);
 Nortonville
 Eva Lucile Travis (HE); Manhattan
 William Wesley Trego (ME); Sedgwick
 Rowena Turner (HE); Chanute
 Ruth Achsah Turner (GS);
 Fairbury, Neb.
 Carl Francis Uhlrich (Ag); Wamego
 Susie Unruh (GS); Pawnee Rock
 Eva Grace Van Scoik (HE); Aulne
 Mabel Van Tries (HE); Wellsville
 John Waldo Van Vliet (VM); Manhattan
 Ira Nelson Vowel (Ag); Norwich
 Earl Frederick Wakefield (CE); Leon
 Eugene Haley Walker (Ag); Manhattan
 Mabel Esther Wallace (HE); Stockton
 Sydney Edward Walton (Ag); Sterling
 Wirt Dudley Walton (Ag); Leavenworth
 Logan Byron Warlick (GS); Manhattan
 Rees Conway Warren (ME); Manhattan
 Eugene Albertice Waters (CE); Wellsville
 Millard Cummings Watkins (EE);
 Clay Center
 Florence Potter Watson (HE); Manhattan
 Esther Waugh (HE); Amherst, Mass.
 William Wallace Weaver (GS);
 Gravette, Ark.
 Ella Henrietta Webb (HE); Tonganoxie
 Vorin Edwin Whan (GS); Manhattan
 Lawrence Francis Whearty (CE);
 Westmoreland
 Elsie Mae Whitacre (HE); Winfield
 Anna Mable White (HE); Carbondale
 Claude Allen White (Ag); Lockney, Tex.
 Juanita Mae Wiest (HE); Hutchinson
 Herbert Lawrence Wilkins (GS);
 Los Angeles, Cal.
 Claude Merlin Willhoite (Ag); Manhattan
 Fred Woods Williams (VM); Sylvan Grove
 Everett Hoover Willis (Ag); Manhattan
 Albert Edgar Wilson (GS); Kinsley
 Charley Trago Wilson (Ar); Little River
 Hazel May Wilson (HE); Luray
 William Clyde Wilson (Ag); Kansas City
 Edwin Wilhelm Winkler (Ag); Rozel
 Milton Shipman Winter (Ag); Leocompton
 Earl Eugene Wintermute (Ag); Sedan
 Edwin Leonard Wolgast (EE); Alta Vista
 Robert Wolnick (ME); Blair
 Earl Bowen Wood (ME); Topeka
 Hubert Earl Woodring (EE);
 Stockville, Neb.
 Clarence Harold Worster (EE); Manhattan
 Mabel Lucile Worster (HE); Manhattan
 Chester Ewart Yenawine (EE); Manhattan
 Pauline Ross Young (HE); Manhattan
 Lulu May Zeller (IJ); Manhattan
 John Williamson Ziegler, jr. (Ag);
 Lansdowne, Pa.
 Charles Zimmerman (ME); Manhattan

FRESHMEN

- Roger Leon Abbott (CE); Garden City
 Ramona Abrams (IJ); Arkansas City
 Helen Lucile Adams (HE); Everest
 Warner Adams (Ag); Maple Hill
 Neal Dow Alleman (ME); Kansas City
 Gladys Eliza Allen (HE); Burlington
 Thomas Henry Allen (EE); Colwich
 Leonard Rhys Allott (Ag); Pueblo, Colo.
 Howard Albert Ames (Ag); Downs
 Maurine Esther Ames (HE); Moline
 Anne Susie Amstutz (HE); Halstead
 Arthur Alfred Anderson (EE); Meriden
 Benjamin William Anderson (CE);
 Agenda
 Delmar Collins Anderson (GS);
 Phillipsburg
 Eunice Miriam Anderson (GS);
 Phillipsburg
 Leslie Dewey Anderson (EE); Randolph
 Orville Clarence Anderson (CE); Maize
 Violet Anna Andre (HE); Horton
 Frank Minton Angus (ME); Sterling
 Margaret Pearl Ansdell (HE); Jamestown
 Clifford Leland Antle (EE); Emporia
 Alfred Lewis Arnold (Ag); Manhattan
 Emmons Leslie Arnold (CE); Marysville
 Wilma Frances Ashby (HE); Girard
 Hildred Aspegren (HE); Republic
 Maurine Ethel Aspy (HE); Hutchinson
 George Smith Atwood (ME); La Cygne
 Marjorie Ault (HE); Naponee, Neb.
 Hazel Josephine Avery (HE); Concordia
 Alfred Leroy Aydelotte (GS); Manhattan
 Agnes Mary Ayers (GS); La Harpe
 Marjorie Manetta Babb (IJ); Douglass
 Doris Bachelor (HE); Belleville
 Alma Margaret Baer (HE);
 Steamboat Springs, Colo.
 Marvin Bahl (Ag); Pleasanton
 Kenneth Albert Baird (Ag); Formoso
 Ralph Waldo Baird (AE); Topeka
 Meta Jennette Baker (HE); Rogers, Ark.
 Lillian Weeks Baldwin (HE);
 Carterville, Mo.
 Eleanor Frances Ball (HE); Gallatin, Mo.
 Kenneth Ballou (Ag); Delphos
 Margaret Roberta Bane (HE); Liberal
 Edna Florence Bangs (GS); Madison
 Fred Bangs (Ag); Madison
 Galen Andrew Barber (EE); Bluff City
 Nellie Mable Bare (HE); Protection
 Nora Elizabeth Bare (HE); Protection
 Atwell Stewart Barkley (Ag);
 St. Joseph, Mo.
 William Paul Barr (IJ); Manhattan
 James Harley Barry (ME); Manhattan
 Lawrence Floyd Barth (Ag); Manhattan
 Nelson Suplee Barth (IJ); Manhattan
 Clyde Marion Baughman (Ag); Mulvane
 Carl Baumgartner (EE); Preston
 Clarence Oliver Bayer (Ag); Quincy
 Edward Rudolph Bayer (Ag); Quincy
 Frederick Harold Bayer (IJ); Yates Center
 Theodore Lawrence Bayer (IJ);
 Yates Center
 William John Bays (GS); Wichita
 Claude Philip Beach (ME); Minneapolis
 Lloyd James Beardsley (Ag); Russell
 Claude Oran Beckett (ME); El Dorado
 Douglas Clifford Beeler (Ag); Manhattan
 Ralph William Bell (EE); Kinsley
 Edith Elenora Bengston (HE); Salina
 Dudley Francis Bentley (Ag); Sterling
 Helane Elizabeth Bentley (HE); Sterling
 Sarah Edith Benton (HE); Attica
 William Glen Berry (EE); Toronto
 Anna Lillian Best (HE); Clyde
 Hattie Betz (GS); Asherville
 Mary Betz (HE); Asherville
 Perry Betz (IJ); Asherville
 Hazel Marie Billings (HE); Maple Hill
 Victor Raymond Blackledge (IJ); Onaga
 Ira Earl Blackney (GS); Home
 Helen Ann Blair (HE); Mulvane
 Werner Jesse Blanchard (ME); Manhattan
 Robert Blanks (CE); Manhattan
 Guy Martin Bonesteel (EE); Haddam
 Harvey Booth (CE); Fairview
 Mary Orebaugh Booth (HE); Fairview
 Roy Eugene Boroff (EE); Manhattan
 Carl William Bower (Ag); Manhattan
 Leone Cheever Bower (HE); Manhattan
 John Braden (Ag); Eureka
 Earl Huff Bradley (CE); Winfield
 Maurice Bradley (CE); Winfield
 Chester Leon Bradshaw (EE); Altoona
 Velma Fairy Bradshaw (HE); Sedgwick
 Eva Beth Brady (HE); Manhattan
 Sadie Brainerd (HE); White Water
 Carl Alfred Brandly (VM); Burlington
 Lola Barbara Brandt (HE); Severy
 *Albert Lorraine Bridenstine (Ag);
 Marienthal
 Ralph Eugene Bridges (CE); Arkansas City
 Nell Ruth Briggs (HE); Hope, Ark.
 Ernest Albert Briscoe (Ag); Latham
 George Thomas Bronson (VM); Waldo
 Francis Neil Brooks (CE); Peru
 Llewellyn Herbert Brooks (GS); Burden
 William Roy Brooks (ME); Fall River
 Helen Anna Brotherson (HE);
 Kansas City
 Glee Mormaduke Brott (CE);
 Junction City
 Clarence Eugene Brown (ME);
 Kansas City, Mo.
 Mary Eleanor Brown (HE); Holton
 Elizabeth Anne Browne (HE); Burdett
 Dollie Edythe Browning (GS); Manhattan
 Nina Myrtle Browning (HE); Manhattan
 Michael Joseph Brull (CE); Everest
 Lewis Jay Bryan (EE); Golden, Colo.
 Glynn Aubrey Buchanan (GS); Downs
 Charles Everett Buford (VM);
 Kansas City
 Carey Allan Bunker (EE); Oregon, Mo.
 Hazel Effie Burdette (HE); Severy
 Emily Burger (HE); Seneca
 Carl Eldin Burke (GS); Solomon
 Harris Loree Burnett (IC); Dodge City
 Harley Kercher Burns (ME); Liberal
 Osceola Hall Burr (GS); Manhattan
 George Harold Burroughs (ME);
 Binghamton, N. Y.
 *Hiram Gilbert Burt (Ag); Garden City
 Mabel Foster Burt (HE); Garden City
 Howard Ernest Burton (Ag);
 Council Grove
 Dwight Calvin Bushey (EE); Muscotah
 Archie William Butcher (IC); Solomon
 Claude Raymond Butcher (Ar); Solomon
 Bertha Viola Butler (HE); Arkansas City
 Carroll Button (Ag); Elmont
 Esteban Aquilar Cabacungan (EE);
 Reina, Isabela, P. I.
 Barbara Alice Campbell (Ar); Mulvane
 Jessie Campbell (HE); Attica
 Dale Harry Carmean (Ag); Valley Falls
 Harold Kenneth Carson (AE); Hamilton
 Paul Bryan Carson (VM); Liberal
 Audrey Byron Carter (GS); Eskridge
 *Sylvester Ulric Case (Ag); Lyons
 Marian Elsie Chaffee (HE); Lasita
 Chester Benjamin Chambers (GS);
 Pomona
 Penn Samuel Chambers (GS); Pomona

FRESHMEN—continued.

- Vera Valentine Chambers (HE); Pomona
 Roy Hubert Chandler (Ag); Englewood
 Edward Jost Chapman (CE); Leavenworth
 Earl Ambrose Chappell (GS); Norton
 Otis Bryan Chappell (EE); Haddam
 Ethel Charles (HE); Republic
 Francis Eugene Charles (Ag); Republic
 Henry Cameron Charless (AE);
 Amarillo, Tex.
 James Tsumu Cheng (GS);
 Foochow, China
 Everett Mize Chesney (Ag); Natoma
 James Childers (Ag); Wamego
 Louis Edward Childers (IJ); Wamego
 Kay Iverson Church (EE); Haddam
 Faye Nettie Churchill (HE); Lebanon
 Wallace Jerome Clapp (GS); Logan
 Kenneth Franklin Clark (Ag); Lascas, Colo.
 Malcolm Jerome Clark (Ag); Lascas, Colo.
 Otto Richard Coburn (CE); Preston
 James Calvin Coffman (Ag); Overbrook
 Theodore Dennis Cole (Ag); Arlington
 Wilbur Dean Cole (CE); Topeka
 Inez Alice Coleman (HE); Sylvia
 Nellie Jane Coleman (HE); Sylvia
 Hubert Lee Collins (Ag); Wellsville
 Gladys Florence Colton (HE); Dover, Okla.
 Evelyn Marilda Colwell (HE); Onaga
 Louis James Combs (GS); Burden
 Halbert Mark Conger (AE); Natoma
 Irene Margaret Conroy (HE); Manhattan
 Thomas Alfred Constable (ME);
 Minneapolis
 Merl Stanley Cook (CE); Dillon
 Merriam Elmer Cook (EE); Bucklin
 Charles James Coon (Ag); Manhattan
 *Edward Harry Cooper (EE); Fort Scott
 David Kennilworth Copeland (Ag);
 Beatrice, Neb.
 Merlin Dale Corbin (ME); Council Grove
 Donald Corby (EE); Arcadia
 Charles Edward Cordts (GS); Overbrook
 Catherine Elizabeth Corey (GS);
 Blue Mound
 Lewis Charles Corey (Ag); Blue Mound
 Warren Cowell (Ag); Clay Center
 Otis DeWitte Cox (Ag); Sedgwick
 Orville Robinson Cragan (GS); Kingman
 Earle Henry Crall (EE); Parsons
 Frank Wright Crawford (VM);
 Gravette, Ark.
 Harold Lee Crawford (Ag); Paola
 Scott Dougherty Criswell (Ag); Manhattan
 John Vincent Croker (EE); Clay Center
 Darcy Elmo Crooke (GS); Phillipsburg
 Erma Julia Cropper (HE); Willcox, Ariz.
 Clarence Paul Cross (EE); Wichita
 Sidney Cross (GS); Climax
 Thomas Cross (Ag); Belle Plaine
 Marietta Crowley (HE); El Dorado
 Frances Walters Croyle (HE); Manhattan
 Russell Cummings (GS); Riverside, Iowa
 Purl Hughie Cunningham (EE); Girard
 Ralph Guthrie Cunningham (GS); Formoso
 Harold Kerr Curry (AE); Dunavant
 Leslie Clifford Curtis (CE); Englewood
 *Charles Otto Dailey (ME); Eminence
 Dora Dean Dakin (GS); Ashland
 Paul Dakin (EE); Ashland
 Luna Daniels (HE); Wichita
 Earl Gilbert Darby (ME); Manhattan
 Calvin Cyrus Davidson (EE); Yates Center
 Cecile Irene Davidson (HE); Yates Center
 David Everett Davis (VM); Manhattan
 Ivan Day (AE); Cleveland
 Karl Samuel Day (EE); Dwight
 Roger Owen Day (CE); Glasco
 John Alfred Deardorff (Ag); Lyndon
 Floyd Archie Decker (EE); Troy
 Ray Lemuel Decker (EE); Troy
 Orville Marshall Deibler (EE); Manhattan
 Elsie Maybelle Deniston (IJ); Manhattan
 Helen Emily Derrick (HE);
 Kansas City, Mo.
 Elmer Frank Deshazer (CE); Merriam
 Alice Louise DeWitt (GS); Medicine Lodge
 Nell Dickman (IJ); Fostoria
 Lawrence Clyde Dillon (GS); Downs
 Eva Christine Dittmar (HE); Manhattan
 Nathan Esdridge Dibelbiss (Ag); Olathe
 Helen Kinney Dix (HE); Newton
 Charles Thomas Dixon (Ag); Leon
 Arthur Wayland Donaldson (EE);
 Lost Springs
 Margaret Elanore Dowell (HE); Hamlin
 Lloyd Harold Downing (EE); Colwich
 Myrtle Sadie Dubbs (HE); Ransom
 Kent Ruggles Dudley (VM); Carlyle
 Clair Eber Dunbar (Ag); Columbus
 *Noel Nardin Dunbar (Ag); Columbus
 Wayne Elbert Dunham (ME); Little River
 Harold Dewey Dunkleberg (ME);
 Osborne
 Jack Wilbur Dunlap (Ag); Scott City
 Frank Leslie Dyer (GS); Culver
 Laura Eagleston (HE); Wichita
 Ellen Louise Easley (HE); Kansas City
 Harold Evert Eaton (GS); Osborne
 Wilma Finley Eaton (GS); Highland
 *Sidney Peter Eberhart (CE); Topeka
 James William Eby (CE); Medicine Lodge
 Marguerite Edelblute (IJ); Manhattan
 Charles Milo Edgerton (IJ); Randolph
 George Graham Edgerton (EE); Canton
 Lois Minerva Edmundson (HE);
 Kansas City
 John William Egger (Ag); Ellis
 Winifred Elder (HE); Waldo
 Leonard Paul Elliott (EE); Holton
 Dorothy Jane Ellis (HE); Pratt
 Raymond John Ellis (GS); Kansas City
 Vernon Ellsworth (ME); Formoso
 Frederick Earl Emery (VM); Baldwin
 Foster Noel Emmons (Ag); Manhattan
 John Hubert English (Ar); Sterling
 Arthur Hunter Epard (Ag); Colby
 Dale Raymond Ernst (EE); Americus
 Lester Edgar Erwin (Ag); Willis
 Herman Chester Esch (EE); Cherryvale
 *Paul Evans (Ag); Williamstown
 Charles William Ewing (Ag); Olathe
 Junius Warren Farmer (Ag);
 St. Joseph, Mo.
 Willis Lee Farmer (CE); Kingfisher, Okla.
 James Lyster Farrand (Ag); Hunter
 David Morgan Feese (CE); Manhattan
 Floyd Lee Firebaugh (Ag); St. John
 Fred Fisher (GS); Overbrook
 Edward Francis Fitzgerald (GS); Colby
 Mary Elizabeth Fitzgerald (HE);
 Waterville
 Frederick Dewey Fix (ME); Minneapolis
 Francis Preston Flack (GS); Eskridge
 Roy Lewis Fleming (Ag); Paola
 Lloyd Fletcher (Ar); Ellis
 Daniel Bishop Fogle (GS); Williamsburg
 Carl Edgar Fogleman (ME); Parsons
 *Timothy Joseph Foley (VM); Chapman
 Ester Clela Folsom (HE); Manhattan
 Frank Carl Foreman (E); Coldwater
 Favel Loranzo Foval (GS); Winfield
 Dan Elias Fox (Ag); Larned
 Sallie Mae Fox (HE); Ashland
 Lee William Frager (EE); Washington
 Rae Frank (IJ); Manhattan

* Under auspices of Federal Board for Vocational Education.

FRESHMEN—continued.

- John Edward Franz (VM); Rozel
 Neosho Louise Fredenburg (GS);
 Council Grove
 Joseph Wallace Freed (GS); Scott City
 Minnie Lee Freeman (HE); Anthony
 Herbert Sawyer French (ME);
 Corpus Christi, Tex.
 Minnie Grace Frey (HE); Manhattan
 Ben Wade Friedel (CE); Fort Scott
 Otis Frederic Fullhage (EE); Yates Center
 Robert Russell Fuller (Ar); Protection
 Ada Elizabeth Fullinwider (HE);
 El Dorado
 Virgil George Fulmer (EE); Emporia
 Willard Clarence Fulton (Ag); Harper
 Arthur Ray Gadbury (EE); Emporia
 Frederick Augustus Gardner (ME);
 Louisburg
 Eugene Lewis Geiger (Ag); Ottawa
 Clarence Raymond George (Ag);
 Manhattan
 Floyd Omar Gerken (VM); Ellis
 Millard Reuben Getty (Ag); Waco, Neb.
 Glen Erwin Ghormley (CE); Manhattan
 Mabel Josephine Gill (HE); Attica
 Margaret Gillett (HE); Junction City
 Gordon Webb Gilman (EE); Council Grove
 Glover Irwin Godwin (VM); Council
 Albert Arthur Goering (EE); Moundridge
 Dewey Aaron Goerke (Ag); Sterling
 Merle Elmer Goff (Ag); Manhattan
 Arthur Ernest Goodwin (GS); Concordia
 Claude Franklin Goodwin (Ag); Scandia
 Daniel Gordon (GS); Manhattan
 Harold Mock Gott (Ag); Arlington
 William Gragg (ME); Severy
 Lucille Alma Gramse (HE); Perry
 Floyd George Grandfield (VM); Maize
 William John Greve (Ag); Freeport
 Carl David Gross (AE); Russell
 La Motte Grover (CE); Salina
 Augustus Wilkes Gudge (ME); Wichita
 Lola Leontine Gudge (GS); Wichita
 Florence Antoinette Haack (HE); Florence
 Paul Larkin Hadley (VM); Glen Elder
 Ray Dryer Hahn (Ag); Clay Center
 Edith Margaret Haines (IJ); Manhattan
 Ednae Lavina Hall (HE); Hoisington
 Lawrence Hall (Ag); Manhattan
 * Claude Carlyle Hampshire (AE); Garnett
 Thomas Dawson Hampson, jr. (GS);
 Fredonia
 Walter Lee Hampson (CE); Fredonia
 * William Edward Haney (EE); Lawrence
 Bess Hansen (IJ); Manhattan
 Gaylord Warren Hargadine (EE); Kinsley
 Miriam Ellen Harling (Ar); Manhattan
 John Elbridge Harner (EE); Keats
 Queenie Esther Hart (GS); Minneapolis
 Hugh Enos Hartman (EE); Manhattan
 Alma Leona Hartzog (HE); Humboldt
 Irwin Lloyd Hathaway (Ag); Newton
 Edith Laura Haupt (HE); Peabody
 Mary Susan Haupt (HE); Peabody
 Oscar Hawkins (CE); Wichita
 Margaret Mary Hawkinson (HE); Clyde
 Vera Doolittle Hedges (GS); Blue Mound
 Terrence Otis Hedrick (CE); Kansas City
 Elfrida Hemker (GS); Great Bend
 Herbert Fred Hemker (AE); Great Bend
 Josephine Frances Hemphill (IJ);
 Clay Center
 Joseph Hendrix (CE); Lane
 Florence Anna Henney (HE); Horton
 Harold William Henney (ME); Horton
 Merle Revere Henre (EE); Kansas City
 Roy Carlyle Henre (EE); Kansas City
 William Ebenezer Henry (EE); Kiowa
 Susan Grace Herr (HE); Medicine Lodge
 Alfred Heusner (GS); Salina
 Omer Ezell Highfill (CE); Claremore, Okla.
 Ross Wayne Hill (Ag); Manhattan
 Forest Reed Hines (EE); Burns
 Howard McMic Hobb (CE); Lebanon
 Foree Hobbie (VM); Dodge City
 Earl Ayers Hockersmith (GS); Manhattan
 Howard Alfred Hodgson (EE); Eureka
 Harold William Hoffhines (EE);
 Manhattan
 Paul Frederick Hoffman (IC); Manhattan
 John Henry Hofmann (CE); Oskaloosa
 Bernice Avis Hoke (HE); Manhattan
 Martha Margaret Holl (HE); Topeka
 Ola May Holland (GS); Geuda Springs
 Dorothy May Hollinger (GS); Chapman
 George Arthur Holloway (IJ); Hutchinson
 James Wing Honeywell (Ag); Leoti
 * Earl Freamount Hoover (VM); Kansas City
 Frank Hoover (CE); Downs
 Hollis Raymond Hope (IJ); Garden City
 Elmer Hopp (FME); Manhattan
 Katherine Margaret Horner (HE); Longton
 George Horney (ME); Medicine Lodge
 Francis Houlton (Ag); Florence
 Frank Whitson Houston (Ag);
 Twin Falls, Idaho
 George Henry Hudson (EE); Wilson
 Harry Newman Hudson (Ag); Topeka
 Eugene Huff (Ag); Chapman
 Claude Irvil Huffman (Ag); Nickerson
 Lee Ellsworth Huffman (GS); Nickerson
 Faith Eleanor Hull (HE); Manhattan
 Ray Clement Hume (EE); Humboldt
 Loyall Virgil Hunt (Ag); Wilmore
 Herman Tompson Hunter (Ar); Eureka
 Fahy William Hurst (ME); Medford, Okla.
 Archibald Hurtgen (ME); Manhattan
 George Dewey Huston (VM); Manhattan
 Susie Katharon Huston (HE); Manhattan
 Bion Shepard Hutchins, jr. (ME);
 Mont Ida
 Sarah Belle Hyde (HE); Altoona
 John Browning Hyton (Ag); Manhattan
 Donald Bryan Ibach (Ag); Arkansas City
 Everett Harold Ingersoll (GS); Overbrook
 Charles Frank Irwin (CE); Le Roy
 Hal Francis Irwin (Ag); Manhattan
 Chester Lowell Ives (EE); Independence
 Earl Harmon Jackson (Ag); Manhattan
 James Felix Jackson (ME); Kansas City
 Frederick Charles Janzen (EE); Hillsboro
 Paul Ronald Jenkins (GS); Salina
 Alice Marie Jennings (HE); Manhattan
 George Arthur Jennings (EE); Girard
 Lester Eugene Jennings (EE); Zeandale
 Charles Louis Jobe (EE); Sedan
 Anna May Johnson (HE); Manhattan
 Arthur Johnson (ME); Vliets
 Ethel Augusta Johnson (HE); Marquette
 Irl Johnson (Ag); Winfield
 James Frank Johnson (Ar); La Crosse
 Jeannette Josephine Johnson (GS);
 Manhattan
 Julia Jeanette Johnson (HE); Herington
 Louis George Johnson (ME); Manhattan
 Mamie Bertina Johnson (HE); Manhattan
 Paul Eugene Johnson (IJ); Wamego
 Frances Allegra Johnston (IJ); Manhattan
 Harold William Johnston (ME); Kipp
 Clifford Charles Jolley (EE);
 Sharon Springs
 Erma Cynthia Jones (HE); Munden
 Margaret Ann Jones (HE); Hutchinson
 William Harold Jones (CE); Burden
 Hazel Azalia Jordan (HE);
 Grand Junction, Colo.

* Under auspices of Federal Board for Vocational Education.

FRESHMEN—continued.

- Marian Jordan (HE); Manhattan
 Nellie Rose Jorns (HE); Preston
 George Harold Joy (ME); Salina
 Anette Helen Kanzer (HE); Hutchinson
 Harlan Kapka (Ag); Kansas City
 Henry Daniel Karns (Ag); Ada
 Mabel Rozella Karr (HE); McLouth
 Bert Emerson Keirns (GS); Downs
 Cordell Cline Keller (Ag); Carthage, Mo.
 Karl Ernest Keller (EE); Kinsley
 Eugene Edward Kelly (FME); Wichita
 Mary Frances Kelly (HE); Bucyrus
 Edwin Charles Kempthorne (IC); Downs
 Charles Harris Kenison (EE); Niles
 Marie Coleman Kent (HE); Franklin, Neb.
 Frank Willard Kerns (Ag); Baldwin City
 William Crawford Kerr (Ar); Manhattan
 Sara Blanche Kershaw (HE); Garrison
 Homer Herbert Kessinger (Ag); Grenola
 Leland Alfred Kettenring (EE); Salina
 Kenneth Key (CE); Wichita
 Ray Stanley Kibler (EE); Sedan
 John Marcus Kindernecht (Ag); Hays
 Jordan Carroll King (GS); Manhattan
 Frank Charles Kingsley (AE); Formoso
 Oscar Edward Kinkead (Ag); Troy
 Dorcas Wines Kirkpatrick (HE); Paradise
 Marion Gibbonney Kirkpatrick (HE);
 Belleville
 Glenn Benson Kirkwood (VM); Marysville
 Irvin Bernell Kirkwood (CE); Marysville
 Iltha Merlin Kistler (ME); Manhattan
 Ila Thelma Knight (HE); Jamestown
 Louis Myers Knight (Ag); Medicine Lodge
 William Francis Knight (Ar);
 Medicine Lodge
 Theodore Knox (Ag); Frankfort
 Alfred Brunner Koch (Ag); Burlington
 Snoda Grace Krider (HE); Cassoday
 Charles Glenn Kuykendall (AE);
 Twin Falls, Idaho
 Susie Margaret Kyle (HE); Abilene
 Jayne Pickford Lamb (IJ); Manhattan
 Helen Pauline Larson (GS); Manhattan
 Opal Juanita La Shelle (GS); Manhattan
 Ernest Arthur Laude (Ag); Humboldt
 Lulu May Leach (HE); Carbondale
 Elden Emanuel Leasure (VM); Solomon
 Herman Lee (IJ); Anthony
 Roscoe Charles Leeper (Ag); Harper
 William Werner Leeper (ME); Goff
 Joseph Bernard Lefert (EE); Burns
 Amy Louise Lemert (GS); Cedar Vale
 Louie Smith Lemert (ME); Liberal
 Paul Amherst Lerew (EE); Portis
 Willis Lloyd Leshner (CE); Dodge City
 Dale Baker Levi (CE); Olathe
 Roger Lilley (EE); Burns
 Charles Otto Lind (FME); Yates Center
 Reuben Carl Lind (Ag); Zeandale
 Frank Bertrand Linn (Ag); Manhattan
 Ching Sheng Lo (VM); Canton, China
 Charles Dewey Logan (EE); Onaga
 Florence Maria Logan (HE); Eskridge
 La Belle Marie Lomax (HE);
 Arkansas City
 Floyd Leroy Longwell (CE); Liberal
 Laura Marie Loomis (HE); Manhattan
 Robert Siegrist Love (CE); Kenneth
 Raymond Russel Luce (IJ); Anthony
 Kai Lum Lung (Ag); Canton, China
 Forrest Nathan Luthy (CE); Carbondale
 Paul Cronin Lyons (Ag); Lawrence
 Grace Lucile McAlister (HE); Topeka
 Max McCandless (GS); St. John
 Percy Howard McCandless (Ag); Natoma
 Ruth Eleanor McCandless (HE); St. John
 Eva McCaules (HE); Lawrence
 Dollie McCartney (HE); Amarillo, Tex.
 James Paul McConnell (GS); Manhattan
 Eugene Emerson McCracken (CE);
 Hiawatha
 Gleason Conn McDonald (EE);
 Pawhuska, Okla.
 Lawrence Dewey McDonald (ME);
 Parsons
 Clyde McDougal (ME); Lane
 Frederick McCloy McIlhinney (EE);
 Manhattan
 Wade Melvin McFarland (Ag); Chase
 Warren Curtis McFarland (Ag); Chase
 George Raymond McGinn (EE); Winfield
 Joseph Slater McGuire (Ag);
 Pawhuska, Okla.
 Andrew James McKee (VM); Manhattan
 Joseph Warren McKinley (Ag); Admire
 Iona Grace McKinney (HE); Englewood
 William Lyle McLean (Ar); Fairbury, Neb.
 William Harry McMahan (ME); Newton
 John McMoran (ME); Coldwater
 Helen Esther McStay (GS); Downs
 Reuben Cleo Maddy (EE); Utica
 *Wilbur Samuel Magill (ME); Topeka
 George Mahaffy (GS); Ottawa
 Duella May Mall (HE); Manhattan
 Bess Mae Markley (HE); Bennington
 Gerald Clay Marrs (ME); Bradford
 Glen Efer Marsh (Ag); Hiattville
 James Fletcher Marshall (CE); Grenola
 Elmer August Martin (Ar); Stockton
 Faith Susan Martin (GS); Winfield
 Sarah Margaret Mason (HE); Belle Plaine
 Lewis Everett Masten (EE); Coldwater
 William Joseph Matthias (Ag); Perry
 Anabel Irene Maughlin (HE); Sylvia
 John Chester Maurer (Ag); Cambridge
 Ralph Merle Mead (CE); Dexter
 Clyde Westel Means (AE); Derby
 Lester Hounell Means (EE); Everest
 Lloyd Earl Means (EE); Kansas City
 Dorothy Minnie Mebus (HE); Kansas City
 Carlos Dewey Medlin (EE); Manhattan
 Raymond Lewis Medlin (EE); Manhattan
 Louise Rebecca Meecke (HE); Wichita
 Lelia Mabel Meeker (HE); Waldo
 Henry John Melcher (EE); Concordia
 Glen Clifford Melvin (EE); Wiley
 Simplicio Sanchez Mendoza (GS);
 San Fernandos, P. I.
 Ernest Ellis Mercer (EE); Sedan
 Charles Chester Merrifield (GS); Peck
 Donald Malcolm Merritt (IJ); Manhattan
 Virginia Malinda Messenger (HE); Basil
 George Albert Meyer (EE); La Crosse
 Jacob Emery Middlekauff (Ag); Vesper
 Franklin Henry Miller (Ag); Hutchinson
 Fred Miller (Ag); Wamego
 Nancy Esther Miller (HE); Beverly
 Orion Newell Miller (CE); Arkansas City
 Walter Miller (EE); Portis
 Edgar Louis Misesegades (EE); Peru
 Helen Margaret Mitchell (HE); Topeka
 Byron Christian Mohrbacher (EE);
 Manhattan
 Esther Ann Moore (HE); Protection
 Garland Lamar Moore (VM);
 Grand Junction, Colo.
 George Lewis Moore (Ag); Lebanon
 Nellie Dale Moore (HE); Protection
 James Richard Moreland (Ag); Formoso
 Cora Bessie Morford (HE); Augusta
 Edna Elizabeth Morgan (HE);
 Undercliff, Colo.
 George DeVore Morris (ME); Manhattan
 Merle Dallas Morris (VM); Paxico
 Johannes Frederick Theobald Mostert (Ag);
 Balfour, S. Africa
 Louise Saloma Moyer (HE); Hiawatha

* Under auspices of Federal Board for Vocational Education.

FRESHMEN—continued.

Alice Martha Mueldener (IJ); Lyons
 John Norton Mullender (EE); Waldo
 Margaret Valentine Murphy (Ar);
 Atchison
 *Harry Albert Myers (Ag); Americus
 Vincent Werner Nass (EE); Atchison
 George Pinckney Neal (Ag); Topeka
 Jesse Harold Neal (AE); Williamsburg
 Chandler Hamlin Nelson (Ag);
 Muskogee, Okla.
 Clifford Carlisle Nelson (GS); Ellis
 Eugene Frank Nelson (CE); Junction City
 Harry Nelson (CE); Bennington
 Nancy Nelson (HE); Paola
 Margaret Nettleton (HE); Lenora
 Jessie Adelaide Newcomb (HE); Garnett
 Lestle Wilber Newcomer (CE); Alexander
 Lella Belle Newkirk (HE); Geneseo
 Geraldine La Von Noffsinger (HE);
 Fall River
 Mahlon John Noll (GS); Florence
 Ruby May Northup (GS); Cuba
 Lillian Belle O'Brien (IJ); Manhattan
 Alpha Irene O'Neil (HE); Prescott
 Maurice Allen O'Neil (CE); Wellsville
 William Frank Orr (Ag); Manhattan
 Harvey Cyrus Osborne (IJ); Ashland
 Alfred Robb Padens (Ag);
 Independence, Iowa
 Merle Lee Padgett (Ar); Manhattan
 Mae Louise Pagels (HE); Beatrice, Neb.
 Cecile Beatrice Paine (HE); Admire
 Evan Herbert Palmer (EE); Palmer
 Lillian Grace Parker (GS); Marion
 Charles Burette Parsons (EE);
 Clearwater
 Loyal Francis Patten (ME); Liberal
 Joseph Patterson (EE); Dillon, Mont.
 Alice Leota Paynter (HE); Alton
 Mildred Lorene Pence (GS); Dunavant
 Loyd McFeaters Perkins (EE); Olathe
 Ralph Henry Peters (EE); Manhattan
 Ralph Kendrick Pfremmer (EE);
 Baxter Springs
 Walter Edgar Pfundstein (EE); Chanute
 Earl Eugene Phares (CE); Burlington
 Don Homer Pickrell (ME); Leon
 Norman Vincent Platner (ME); Ellis
 Eva Mildred Platt (HE); Manhattan
 Raymond Edward Porter (EE); Glen Elder
 John Sherman Posten (ME); Caldwell
 Jay Pounds (EE); Coldwater
 Florence Mildred Powers (HE); Marion
 Earl Lewis Preston (EE); Gorham
 Lawrence John Price (Ag); Quenemo
 Madge Augusta Price (GS); Fredonia
 Helen Jeanette Priestley (HE);
 Kansas City
 Ruby Elizabeth Pruitt (HE); Goddard
 Harry Donald Pugh (Ag); Topeka
 Newton Quan (Ag); Canton, China
 Herbert Dewey Quick (Ag); Redfield
 John Monroe Raish (EE); Iola
 George Joseph Raleigh (Ag); Clyde
 Walter Patrick Raleigh (Ag); Clyde
 Marion Ellsworth Ramsey (GS);
 Osage City
 Ruth Rachael Rannels (HE); Manhattan
 Harry Elijah Ratcliff (Ag); Gaylord
 Robert Smith Rath (GS); Agenda
 Louise Rathman (HE); Wichita
 Garold Asa Ratliff (EE); Bucklin
 Margaret Marian Reasoner (IJ);
 Herington
 Wesley Philip Reazin (CE); Macksville
 Gordon Redman (Ar); Manhattan

Leland Harold Reece (EE); Oxford
 Leona Maxine Reed (HE); Ottawa
 Louise Eilene Reed (HE); Ottawa
 Stanley Reed (GS); Burlington
 Thomas Bernard Reed (EE); Glasco
 Roger Eli Regnier (EE); Wamego
 Margaret Reich (IJ); Glen Elder
 Frederick Thomas Reyling, jr. (AE);
 Kansas City
 Keitha Mardel Rice (HE); Girard
 John William Richards (GS); Madison
 Sarah Hazel Richards (HE); Howard
 Ralph Burton Ricklefs (Ag); Troy
 Ruby Anna Ricklefs (HE); Troy
 Ivan Harris Riley (Ar); Newton
 Ruth Elizabeth Rinehart (HE); Topeka
 Glenn Alvin Rixon (Ag); St. John
 Denton Oliver Roberts (Ag); Stafford
 Max Duane Roberts (Ag); Pomona
 Mott Luther Robinson (Ag); Lowemont
 Myrt Dorwin Robison (EE); Manhattan
 Richard Jay Rogers (Ag); Louisburg
 Shirley Nugent Rogers (GS); Manhattan
 Joe Shelby Rolston (EE); Burlington
 Lillian Foster Rommel (GS); Waterville
 Nettie Corrinne Rork (HE); Muscotah
 John Whiteley Rose (Ar); Luray
 Renna Regina Rosenthal (HE); Topeka
 Clarence Virgle Rost (EE); Sedan
 Clyde Edward Rothrock (EE); Salina
 Jesse Oliver Rothrock (EE); Salina
 Glenn Lyonel Rucker (EE); Burdett
 Gretchen Rugh (HE); Abilene
 Charles Guy Russell (Ag); La Crosse
 Edith Elva Russell (HE); Paola
 Edna Blanche Russell (HE); Stafford
 Hazel Lillian Russell (HE); Winfield
 Morton Rust (ME); Downs
 Pearl Ruth (HE); Horton
 Grace Elvena Sachau (HE); Manhattan
 John Miles Sahlberg (EE); Junction City
 McSellan Sallee (ME); Marion
 Royal Theodore Sandow (GS); Dillon
 Christine Halene Saunders (HE);
 Amarillo, Tex.
 Eugenia Bertella Sayler (HE); St. John
 Ira Ferdinand Schindler (GS);
 Valley Falls
 Freda Schlender (HE); Moundridge
 Henry William Schmitz (Ag); Alma
 Eben Ellsworth Scholer (CE); Milo
 Glen Garfield Schoof (AE); Council Grove
 Grace Dorothy Schultz (HE); Spearville
 Grace Aurora Schwandt (HE);
 Manhattan
 George Welch Sconce (IJ); Hoyt
 Charles Erwin Scott (Ag); Westmoreland
 Eugene Saxton Scott (Ag); Burlington
 Irene Scott (HE); Westmoreland
 Jay Dewey Scott (EE); Hutchinson
 Susan Scott (HE); Manhattan
 Don Seaton (Ag); Waterville
 Harold Leon Sebring (Ar); Gardner
 Opal Sarah Seeber (GS); Great Bend
 Glen Seely (GS); Wilroads
 Marie Sellers (HE); Wellington
 Ashford Clinton Settle (IJ); Quincy
 William Eugene Settle, jr. (CE);
 Wynnewood, Okla.
 Ruby Lavisa Seward (HE); Leon
 Rolland George Shafer (IJ); Milo
 Edward Shaffer (IJ); Minneola
 Randall Joel Shaw (CE); Medicine Lodge
 Helen Irma Shellhaas (GS); Abilene
 Francis Marlin Sherwood (ME); Grenola
 Ralph Jessup Shideler (IJ); Girard

* Under auspices of Federal Board for Vocational Education.

FRESHMEN—continued.

Robert Theodore Shideler (CE); Girard
Frank Howard Shirck (Ag); Waterville
Sophia Mary Shirley (HE); Osage City
Ellen May Shoemaker (HE); Severy
Irene Shoemaker (HE); Severy
Margaret Evelyn Shrader (HE);

Cedar Vale

Veryl Wilnot Simons (FME); Howard
(Deceased)

Dale Stanley Simonson (Ag); Anthony
Wesley Earl Simpson (Ag); Welda
Percy Sims (Ag); Little River
Leland Otis Sinderson (EE); Manhattan
Deal Six (Ag); Versailles, Ill.

* Joseph William Skinner (EE); Thayer
Owen Glee Skinner (Ag); Marion
Bernice Mary Slane (HE); Parsons
Jeanette Alice Sleeper (HE); Topeka
Harold Arthur Smiley (Ag); Topeka
Boyd Walford Smith (CE); Winfield
Charles Randolph Smith (IJ); Herington
Ethel May Smith (HE); Carbondale
Herbert Clayton Smith (EE); Longton
Lucile Evelyn Smith (HE); Topeka
Paul Cressman Smith (GS); Manhattan
Sarah Frances Smith (HE); Durham
Stephen Roy Smith (Ag); Beloit
Thelma Enid Smith (GS); Manhattan
Theodore Knostman Smith (EE);
Council Grove

Verna Elizabeth Smith (HE); Manhattan
William Donald Smith (IC); Hutchinson
William Malcolm Smith (EE);

Burlingame

Jessy Elmer Snyder (AE); St. John
Vivian Melancthon Solt (ME); Barnes
Ada Joan Songer (GS); Manhattan
John Elbert Speer (EE); Dickens, Tex.
Harold Spence (GS); Valley Falls
Clarence Martin Spencer (FME); Emporia
Ora Milo Spivey (ME); Minneapolis
Robert Cleveland Spratt (CE);

Kansas City

Harry John Staib (EE); Turon
Ernest Floyd Stalcup (ME); Hutchinson
John Stalder (AE); Meade
Richard Harold Stanhope (GS); Eureka
Florence Margaret Stebbins (GS); Ellis
Fred Aye Stewart (Ar); Rossville
Hazel Fern Stewart (HE); Sedgwick
Theodore Roosevelt Stickel (Ag); Padonia
Theodore Roosevelt Still (GS);

Tonganoxie

Frederick Hayden Stimson (VM);
Princeton, Mass.

Fred Carl Stockebrand (CE);

Yates Center

Glenn Dale Stockwell (Ag); Larned
Warren Edward Stone (Ar); Saffordville
Esther Naomi Storey (HE); Freeport
William Harvey Stotts (Ag);

Kansas City, Mo.

Carl Robert Stout (ME); Kansas City
Ida May Stout (GS); Newton
Austin William Stover (EE); Topeka
Raymond Luther Stover (Ag); Topeka
Clark Oliver Stratford (CE); El Dorado
Genevieve Anna Stricklin (HE); Liberal
Ralph Stricklin (FME); Liberal
Arthur Stuart (Ag); Glen Elder
Ernest Lee Stucker (EE); Cimarron
Otto Engel Stueber (ME); Parsons

* Ernest William Stuenkel (CE); Lenora

* Under auspices of Federal Board for V
Frank Hobart Stuessi (AC); Kansas City
Julius Carl Stuewe (GS); Alma
Sidney Clifford Stumpt (EE); Dodge City

Susan Anna Stutz (HE); Manhattan
Wilma Sutton (HE); Kingman
William Ernest Swarner (CE); Rosedale
Cecil Orton Swearingen (ME);

Kansas City

Lynn Darling Swisher (GS); Lyndon
Loy Glenn Tabor (EE); Liberty, Mo.
Frances Ione Taylor (HE); Chapman
George Ellis Taylor (Ag); Hiawatha
Gladys Eleanor Taylor (HE); Chapman
Jesse Everett Taylor (Ag); Stafford
John Frederick Tessendorf (EE); Onaga
Eleanor Abigail Thackeray (HE);

Simeon, Neb.

Paul Arden Tharp (CE); Winfield
Warren Perry Thayer (ME); Manhattan
Leafy Esther Thierolf (HE); Wamego
Mildred Addison Thompson (HE); Alma
Meryl Ethelyn Thornburg (HE);

Manhattan

Fern Marie Thornton (HE);
Fairbury, Neb.

William Charles Thruston (CE);

Kansas City

Ada Belle Tidd (HE); Neosho Falls
Mildred Marie Tilman (HE); Parsons
Stuart Oscar Tindell (EE); Burlingame
Sallie Louise Toler (HE); Anthony
Kenneth Marshall Topping (EE);
Overbrook

Marion Louise Traynor (HE); Dodge City
Orval Welton Tripp (ME); Waldo
George Edward Troup (GS); Lincoln
Lorna Doone Troup (GS); Abilene
* Floyd Jacob Tucker (ME); Minneola
Charles Lee Turley (IJ); Hutchinson
Daniel Overton Turner (AE); Milton
Joseph George Tustison (EE);

Yates Center

Emmett Joseph Tuttle (IJ); Kansas City
James Lowell Van Gilder (Ag);

Manhattan

Glen William Van Orsdol (CE);
Rossville

Henriette Veeh (HE); Speed
Frederic Elias Vickrey (VM); Sabetha
Lola Beatrice Vincent (HE);
Amarillo, Tex.

Mable Irene Vincent (GS); Sterling
Paul Anthony Vohs (EE); Osawatomie
George Ellsworth Voiles (CE); Manhattan
Emil von Riesen (CE); Marysville
Esther Lee Waddell (HE); Alexander
Max Harley Waddell (Ag); Olathe
Arthur Rutherford Waits (Ag); Cassoday
Pearl Mable Wakefield (HE); Leon
Frank Edward Walbridge (EE);

Kansas City

Charles Stone Waldo (ME); Ellis
Martha Winifred Walker (HE); Winifred
Richard Leo Waltner (EE);

Freeman, S. Dak.

Homer Dexter Walton (EE);
Armada, Mich.

Harry Kneeland Wareham (IJ);
Manhattan

William Everette Wareham (GS);
Manhattan

George Russell Warthen (Ag);
Webb City, Mo.

Sheldon Edward Washburn (Ag);
Spivey

John Wesley Wasson (ME); Peru
Eleanor Emily Watson (HE); El Dorado
Lavina Amelia Waugh (HE); Hiawatha
Charles Franklin Weddle (IJ); Topeka
Fred Charles Weide (CE); Yates Center

* Under auspices of Federal Board for Vocational Education.

FRESHMEN—concluded.

- Marie Weinheimer (HE); Ottawa
 Raleigh John Weir (EE); Beloit
 Carl Weiss (ME); Ada
 Luis Barrett Welch (Ag); Redfield
 Robert Lee Welton (Ag); Fairview
 Ruth Elizabeth Welton (HE); Fairview
 Albert Parken Wertman (Ag); Washington
 Zoe Dorothy Wertman (HE); Washington
 Garnett Emmafred Westbrook (IJ);
 Manhattan
 Frank Loy Westerman (EE); Colby
 Ruth Ida Whearty (HE); Westmoreland
 Doris Sarah White (HE); Manhattan
 Harold Maurice White (ME); Minneapolis
 Webster James White (ME); Ada
 Wilton Parker White (EE); Quincy, Ill.
 Clifford Lyle Whitmer (EE); Norwich
 Wiley Whitney (IC); Troy
 Robert Brown Whittaker (IJ);
 Yates Center
 Susanna Whitten (HE); Wakarusa
 Henry Evert Wiechers (Ar); Downs
 Dietrich Virgil Wiebe (Ag); Lehigh
 Adelaide Louise Wieters (HE); Lanham
 Mary Wight (HE); Antelope
 Elmer Edward Wiley (CE); Everest
 Archie Clay Williams (Ag);
 Siloam Springs, Ark.
 Donald Paul Williams (GS); Rush Center
 Howard Williams (EE); Kiowa
 John Reed Williams (GS); Florence
 Luther Williams (Ag); Osage City
 Philip Williams (GS); Ottawa
 Raymond Montrose Williams (VM);
 Rosedale
- * Cecil Cline Wilson (Ag); Canton
 Donald Maxwell Wilson (CE);
 Warrensburg, Mo.
 Ella Inez Wilson (HE); Luray
 Fred Emery Wilson (Ar); Kinsley
 Grace Dorothy Wilson (HE); Centralia
 Jerome Wilson (GS); Kinsley
 John Leod Wilson (GS); Ottawa
 Neomi Ruth Wilson (HE); Sedgwick
 Jesse Collins Wingfield (Ag);
 Junction City
 Florence Anna Winkler (HE); Maple Hill
 George Hugh Winters (GS); Downs
 Amy Inez Wismer (GS); Pomona
 Leanore Lucy Wolfe (HE);
 Placerville, Colo.
 George Wood (Ag); Anthony
 Orwin Chester Wood (EE); Oakland
 Wallace Leland Woodard (IC); Fort Scott
 Philip Redding Woodbury (Ag); Olivet
 Grant Thomas Woodward (VM);
 Franklin, Idaho
 Daniel Marion Woodworth (Ag); Sedan
 Alden Woody (IC); Lincoln
 Oscar Griffith Woody (Ar); Lincoln
 Frank Joseph Worster (IC); Manhattan
 Bernie William Wright (Ag);
 Arkansas City
 Leroy Lawrence Wurst (EE);
 Russell Springs
 Donald Albert Yandell (VM); Dodge City
 Winston Churchill Yokum (EE); Welda
 John Anton Ziebarth (VM); Manhattan
 Harrold Veere Zimmerman (GS);
 Hutchinson

SPECIAL STUDENTS

- May Maria Abbott (M); Manhattan
 William Maynard Agnew (Ag);
 Yates Center
 Claretta Odessa Allen (GS);
 Wynnewood, Okla.
 George Robert Allingham (GS); Manhattan
 Lillian Louise Amos (M); Manhattan
 Neil Williams Anderson (Ag); Wichita
 Ruth Neta Andrews (M); La Crosse
 Margaret Armantrout (GS); Guthrie, Okla.
 Elmer Rex Ausemus (Ag); Cherokee
 Andrew Ansel Axline (Ag); Pratt
 Frances Amelia Ayars (HE); Manhattan
 Ollie Emerson Babcock (M); Harper
 Adalia Capsey Backman (M); Manhattan
 Glenn Bernard Bailey (Ag); Pratt
 Grace Eliza Baker (GS); Baldwin City
 Nellie Mary Ellen Baker (GS);
 Baldwin City
 Royce Arvide Baldwin (IJ); Belleville
 Richard Roscoe Ball (Ag); Lyons
 Donald David Ballou (GS); Delphos
 Marie Marguerite Banning (HE);
 Lawrence
 Mary Graff Barcafer (GS); Kansas City
 Herbert John Barr (Ag); Larned
 Neva Neola Barrows (M); Clifton
 Alma Jessie Bauerfeld (M); Yates Center
 Hazel Eva-Zella Bauerfind (HE);
 Minneapolis
 Lloyd Irwin Belveal (M); Delphos
 Charles Wessen Bennett (GS); Wichita
 Samuel Lester Blakesley (Ag);
 Fairbury, Neb.
 Ross King Blaylock (Ag); Smith Center
 Donald Earl Blocksome (GS); Ransom
 Martin Quincy Blosser (Ag); Norway
 Orille Mariette Bourossa (GS); Topeka
- Dan Dana Bramwell (GS); Belleville
 Mary Briggs (HE); Parsons
 Oliver Wendel Broberg (GS); Manhattan
 Flo Brown (M); Salina
 Pearle Elizabeth Brown (M); Blue Rapids
 Theodore Brown (Ag); Fall River
 William Earl Bruce (GS); Wichita
 Nina Ruth Burgess (GS); Manhattan
 Anna Marie Burky (M); La Crosse
 Walter Horace Burr (GS); Manhattan
 Elgin Roy Button (Ag); Topeka
 Ira Oren-Call (GS); Downs
 Constantine Diamandis Calogeris (Eng);
 Manhattan
 Charles Campbell (Ar); Wichita
 Rolla Earl Campbell (Eng); Topeka
 Bryan Lee Cauty (Ag); Buffalo
 Daphne Lucille Cary (M); Taloga, Okla.
 Glen Marvin Case (M); Alta Vista
 Ivy Hildreth Case (M); Alta Vista
 Mildred Fern Champion (GS); Manhattan
 Olga Elva Chappell (GS); Haddam
 Bert Edward Church (GS); Haddam
 George Samuel Clinton (Ar); Leavenworth
 Helen Martin Colburn (M); Manhattan
 Alfred John Collingwood (Ag);
 Pretty Prairie
 Victor Vincent Cool (GS); Manhattan
 Ennis Morrow Cooley (Ag);
 Jonesboro, Ark.
 Clarence Corbet (GS); Highland
 Warren Hall Coutts, jr. (GS); El Dorado
 Doris Mildred Crandall (M); Manhattan
 Arthur Weston Crocker (Ag);
 Matfield Green
 Helen Elizabeth Dale (M); Protection
 Charles DeForest Davis (Ag); Manhattan
 Jessie Hedden Davis (GS); Manhattan

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SPECIAL STUDENTS—continued.

- Lewis Brown Deal (ME); Newton
 Lloyd Eugene Deister (Ag); Stanley
 *Clyde Charles Dille (Ag); Beattie
 Thelma Marie Dobson (M); Winfield
 Alberta Douglass (HE); Lyons
 Bertha Mae Dubbs (GS); Ransom
 Netta Elizabeth Dubbs (M); Ransom
 Wayland Aubrey Dunham (GS); Topeka
 Jessie Winifred Edwards (HE); Sterling
 Milton Stover Eisenhower (IJ); Abilene
 Clelia Lauretta Elder (M); Burr Oak
 John Burton Elliot (GS); Manhattan
 Jessie Josephine Erickson (GS); Manhattan
 Gladys Winifred Faley (M); Manhattan
 James Pryor Fallis (GS); Wichita
 Leonard Clarence Fields (ME);
 Kansas City
 Dora Shartei Finley (IJ); Manhattan
 Nelle Flinn (GS); Admire
 Daisy Boswell Floyd (GS); Manhattan
 Catherine Agnes Fox (HE);
 Columbus, Ohio
 Annje Elizabeth Fraser (M); Manhattan
 Clarence Edwin Freeto (Ag); Wichita
 *Clarence Friend (Ag); Hodgenville, Ky.
 Joyce Katherine Fuger (M); Wathena
 Hazel Irene Gardner (HE); Hutchinson
 Roy Preston Garrett (GS); Manhattan
 *Jesse Conrad Geiger (CE); Wichita
 George Albert Gemmell (Ag); Manhattan
 Mary Grace Gerkin (M); Riley
 Gladys Lee Gilbreath (M); Arkansass City
 Jean Florence Gill (HE); Kansas City
 Evelyn Marie Glenn (M); Medford, Okla.
 *Clarence Raymond Gottschall (ME); Salina
 Mary Graham (HE); Manhattan
 Marion Abraham Graham (IJ); Manhattan
 Gladys Graybill (M); Newton
 Allen Edward Green (Ag); Eureka
 Sherrod Wood Griffin (Ag); Parsons
 *Richard Bernard Griffenhagen (VM);
 Colorado Springs, Colo.
 Raymond Gross (GS); Salina
 Yáo Verreira Guedes (Ag);
 Brazil, South America
 Luke Albert Guilfoyle (Ag); Wamego
 Hester Hackney (HE); La Harpe
 Francis Lester Haggard (ME); Topeka
 Alvin Bentley Haines (EE); Nickerson
 Clarence Hurschell Haines (Ag); Haven
 Robb Augusta Hake (ME);
 Kansas City, Mo.
 Lloyd Lee Hamilton (IJ); Wichita
 Meade Thomas Hargis (Ag); Manhattan
 Stella Maude Harriss (GS); Fairbury, Neb.
 Margaret Ann Hawbaker (M); Neosho, Mo.
 Ada Caroline Hawkins (GS); Scandia
 Elizabeth Heath (HE); Peabody
 Bernice Elma Hedge (M); Norton
 *Harvey Doughty Henschel (Ag);
 Kansas City, Mo.
 *Orville Bryan Hoff (Ag); Kansas City, Mo.
 Norvil Forest Holbrook (GS); Jetmore
 Orval Everett Holzer (EE); Girard
 Arlie Alfreda Honeywell (GS); Seneca
 Flora Pearl Hoots (M); Winfield
 *Harold Dunbar Hopkins (EE); Udall
 John Albert Howarth (Ag); Manhattan
 Esther Aldea Huling (HE); Manhattan
 Cecil Britt Humbarger (EE); Culver
 Albert Ross Hutchinson (Ag);
 Kit Carson, Colo.
 Ralph Josiah Hutchman (Ag); Pittsburg
 Julia Ikenberry (GS); Quinter
 Paul Henry Jeffcoat (GS); Abilene
 Robert Doah Jenkins (EE); Kinsley
 *Harry Clayton Jennings (ME); Manhattan
- *Carl Johnson (Ag); Marquette
 Elsie Vera Johnson (M); Manhattan
 Graham Johnson (Ag); Norman, Okla.
 Montford Tilford Johnson (Ag);
 Norman, Okla.
 Minnie Augustine Johnston (HE);
 Manhattan
 Glen Nelson Karstadt (Ag); Bennington
 Anita Pearl Kazmaier (HE); Wellsville
 Reines Andrew Keagy (GS); Ellis
 Arthur Joseph Kelly (Ag); Wichita
 Robert Cathcart Keys (GS); Winchester
 Jacob Acil Kibler (EE); Sedan
 Ellis Kimble (EE); Liberal
 Arthur Glenn Kincaid (Ag); Wathena
 Ernest Otto King (GS); Caldwell
 Lee Travis King (GS); Manhattan
 Kathryn Alberta Kinnman (M); Ashland
 Harvey Benjamin Kinsinger (EE);
 Ness City
 *Bertie Ray Kirkpatrick (Ag); Paradise
 Ruth Kathryn Kittell (Ar); Newton
 Katherine Brosia Knapp (M);
 Arkansas City
 Elsie Agnes Knox (M); Leon
 Ruth Ester Lambertson (M); Fairview
 John Ernest LaMont (EE); Manhattan
 Harold Amos Layton (GS); Osborne
 Thomas Bernard Leahy (Ag);
 Pawhuska, Okla.
 Frieda Limper (M); Manhattan
 Arnold Leone Lovejoy (M);
 Union City, Mich.
 Allan August Ludeman (Ag); Anthony
 William Francis Lyons (Ag); Lawrence
 George Barton McAlister (Ag); Waterville
 Jessie Edwina McCampbell (HE);
 Manhattan
 Albert Léon McCauley (CE); Fowler
 Roy Nellis McCue (IJ); Bucklin
 Ralph Reuben McFadden (Ag);
 Jonesboro, Ark.
 Maurine McLachlin (M); Paola
 Helen Faye Magruder (M); Pratt
 *Claude Stanton Marshall (Ag); Gardner
 Mary Matilda Marshall (HE); Manhattan
 William Worthington Marshall (Ag);
 Dallas, Tex.
 Franz Benedict Mayer (CE); Newton
 Victor Mead (GS); Wichita
 Eva Rebecca Mellenbruch (M); Hiawatha
 Marvel Mona Merillat (GS); Great Bend
 Florence Imogene Meyer (M); Anthony
 Louie Bert Micklish (Ag); Jonesboro, Ark.
 Jessie Enola Miller (IJ); Belleville
 Richard Roscoe Miller (Ag);
 Kansas City, Mo.
 Olivette Viola Mitsch (M); Woodbine
 Lura Marie Mohrbacher (HE);
 Manhattan
 Beatrice Pauline Moller (HE);
 Parkville, Mo.
 Fred Gillespie Morgan (Ag);
 Alta Vista
 Rudolph Morgenstern (GS); Salina
 Guy Mount (GS); Fredonia
 Walter Starbuck Munson (Ag);
 Utica, N. Y.
 Mabel Ardis Murphy (GS); Nickerson
 Frank Lewis Myers (VM); Topeka
 Ray Hobart Newkirk (Ag); Geneseo
 Chester Willis Oakes (Ag); Collins, Ark.
 Howard O'Brien (M); Manhattan
 Benedicto de Oliveira (Ag);
 Jannaria, Brazil
 Marjorie Lois O'Neill (GS); Topeka
 Ruth Lucile Owens (M); Russellville, Ark.

* Under auspices of Federal Board for Vocational Education.

SPECIAL STUDENTS—concluded.

- Francis Michael Padgett (GS); Beloit
 Bryan Kenneth Perreault (GS);
 Morganville
 Marie Elizabeth Peterson (M); Randolph
 Leon Gillespie Phifer (GS); Rosedale
 Harla Phillips (GS); Paola
 Irene Pieratt (GS); Hartford
 Archibald Prehn (Eng.); Manhattan
 Frances Fuller Price (GS); Paola
 Lena Price (GS); Mound Valley
 Paul Orlando Purdue (GS); Jetmore
 Jerry Thomas Quinn (Ag); Manhattan
 Alvaro Vavarro Ramos (Ag);
 Bolivia, Brazil
 * Alfred Lee Rapp (GS); Americus
 Ruth Bernetta Rathbone (M);
 Manhattan
 Earl Herbert Raymond (GS); Towanda
 Florence Elizabeth Reiner (GS);
 Manhattan
 Alice Marine Rice (M); Topeka
 Corinne Vida Richards (M);
 Kansas City, Mo.
 John Edgar Richardson (Ag);
 Manhattan
 Arthur Howard Riley (VM);
 Minneapolis, Minn.
 Frank Leslie Roark (GS); Manhattan
 Susie Robb (GS); Salina
 Ruth Roberta Robison (GS); Towanda
 Margaret Geresa Rochford (M); Osborne
 Margaret Roderick (HE); Manhattan
 LaTona Rohrer (GS); Gardner
 Roland Edmond Roney (Ag); Scranton
 Harold Ashley Rood (Ag); Peabody
 Laura Faye Russell (M); Stafford
 McKinley Guy Sampson (GS); Wichita
 Inez Sargent (GS); Smith Center
 Robert Ewing Sears (Ag); Eureka
 Roy Zolu Shearer (Ag); Mullinville
 Omer John Shields (Ag); Lost Springs
 Mae Blanche Siefkin (GS); Wichita
 Carl Franklin Simpson (GS); Tulsa, Okla.
- Viola Marguerite Simpson (M);
 Herington
 Homer Joseph Sloop (GS); Boyle
 Dwight Smith (M); Junction City
 Esther Smith (HE); Manhattan
 Grace Margie Smith (HE); Manhattan
 Bernice Myrtle Spence (M); Hanover
 Marion Stauffer (GS); Marion
 Maude Dolfinger Stewart (M);
 Phoenix, Ariz.
 Helen Sullivan (M); Ashland
 Merton Henry Swanson (GS); Manhattan
 Walter Henry Tatge (Ag); White City
 Gertrude Doud Tetrick (GS); Manhattan
 Samuel Isaac Thackrey (GS); Manhattan
 Harold Hetherington Theiss (EE);
 Hutchinson
 Mildred Hazel Thornbug (M); Formoso
 Curtis Tippin (Ag); Manhattan
 * Emile Aubrey Toms (Ag); Independence
 Willard Orin Tucker (VM); Manhattan
 Paul Tupper (Ag); Lecompton
 Dortha Estella Turner (M); Clifton
 Fernando Valdes (Ag); Santiago, Chile
 Ignacio Valdes (Ag); Santiago, Chile
 Vernon Valens Van Hook (GS); Topeka
 Arilla Wadsworth (M); Pugalley, Wash.
 Florence Elizabeth Waits (GS); Cassoday
 Imogene Caroline Warner (GS); Downs
 Frances Elizabeth Washington (GS);
 Manhattan
 Mary Goldie Watts (M); Smith Center
 Harold Parker Wheeler (M); Manhattan
 Edward Francis Whelan (Ag); Purcell
 Helen Marie Wieters (GS); Lanham
 Roy Williams (Ag); Miami, Okla.
 Arthur James Williamson (M);
 Washington
 Paul Roscoe Willis (Ag); Horton
 Anna Alberta Wilson (GS); Wichita
 Maudie Margaret Wilson (HE); Sabetha
 Nathaniel Preston Woods (Eng.);
 Ellsworth

SUMMER SCHOOL

- Ida Gertrude Adee, Manhattan
 James Frederick Adee; Manhattan
 Sister Mary Zoe Ahern; Leavenworth
 Pearle Akin; Manhattan
 Harry Whitford Alexander; Manhattan
 Anne Susie Amstutz; Halstead
 James C. Anderson; Salina
 Mary Clarissa Anderson; Huron
 William Hiddleston Andrews; Manhattan
 Robert Max Armstrong; Manhattan
 Harry J. Austin; Manhattan
 Cecile Ione Baldwin; Manhattan
 Lillian W. Baldwin; Carterville, Mo.
 Ethel Loberta Bales; Manhattan
 Helen Hunt Bales; Manhattan
 Justus Wheeler Barger; Newkirk, Okla.
 Gourney A. Barker; Pratt
 John William Barker; Pratt
 John Battin; Oberlin
 Mrs. Merrel Battin; Oberlin
 Burton Bernard Bayles; Manhattan
 Esther Grace Bayles; Osage City
 Florence Loraine Beck; Riley
 Clyde E. Beckett; El Dorado
 Wirt Walton Bell; Marysville
 Howard Dale Bennett; Harper
 Ada Grace Billings; Vermillion
 Bertha Biltz; Manhattan
 Lindley Charles Binford; Haviland
 Iva Rose Bishop; Haven
- Anna Maude Blackwell; Manhattan
 Mary Avis Blain; Manhattan
 Ruth Blair; Hutchinson
 Mayme Boone; Topeka
 Mildred Botkin; Burden
 Grace A. Bradley; Norcatur
 Roy Shipman Breese; Manhattan
 Christiana Lovina Brewbaker; Manhattan
 Arthur Hayes Brewer; Manhattan
 Cleve Briggs; Parsons
 A. A. Brown; Norton
 Margaret S. Browne; Burdett
 Dollie Edythe Browning; Manhattan
 Genevieve Vador Bruce; Manhattan
 Wesley Gordon Bruce; Riley
 Harry Ray Bryson; Leon
 Consuelo Bullock; Manhattan
 Bertha Anna Burk; Clifton
 Osceola Hall Burr; Manhattan
 Georgia Elizabeth Carey; Manhattan
 Myrtle Carey; Houston, Tex.
 Flora Lydia Carl; Springfield, Mo.
 Ida Alfreda Carlson; Manhattan
 Zattie Otellia Carp; Wichita
 Frank Carr; Manhattan
 Audrey Byron Carter; Eskridge
 Frank Herbert Clark; Bendena
 Mary Gladys Clark; Manhattan
 Anne MacDonald Clarke; Manhattan
 David Charles Clarke; Manhattan.

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SUMMER SCHOOL—continued.

- Fred Cockerell; Manhattan
 Helen M. Colburn; Manhattan
 Sarah Alda Conrow; Manhattan
 Christine Carol Cool; Manhattan
 Commodore F. Cool; Manhattan
 Charles James Coon; Manhattan
 Robert Stanley Coon; Manhattan
 Nadia Dunn Corby; Manhattan
 Albert Lee Costello; Manhattan
 Sister Mary Hypatia Coughlin;
 Leavenworth
 Kathryn Louise Coyne; Linwood
 Verral Janice Craven; Erie
 Alverta May Cress; Manhattan
 Claude B. Cross; Emporia
 Blaine Crow; Havensville
 Ethel Ann Crumbaker; Onaga
 Mary Grace Crumbaker; Onaga
 Sister Mary Brigida Cunneen;
 Leavenworth
 Elsie Winifred Cuthbert; Manhattan
 Bertha Louise Danheim; Blue Rapids
 David Charles Clarke; Manhattan
 Sarah E. Davies; Riley
 Marion Bradford Davis; Manhattan
 Helen Josephine Dawley; Manhattan
 Birdie Ethel Dean; Nickerson
 Mildred Emma Dean; Nickerson
 Sister Mary Lorain Degan; Leavenworth
 Abbie Clair Dennen; Manhattan
 Percy Leroy DePuy; Manhattan
 Sister Mary Francis Derben; Leavenworth
 Sister Marianna De Tarr; Leavenworth
 Gladys De Vore; Winfield
 Henry Dougherty; Manhattan
 Sister Octavia Dougherty; Leavenworth
 Odessa Della Dow; Manhattan
 Thomas Drake; Manhattan
 Minnie Josephine Dubbs; Ransom
 Hazel Viola Dyer; Oberlin
 Richmond Knostman Elliott; Manhattan
 Maggie Ellis; Westmoreland
 John Melvin England; LeRoy
 Nelle Elnora Ensign; Waterville
 Sister Mary Oswald Erb; Leavenworth
 Sister Joan Marie Erbacher; Leavenworth
 Sivert Eriksen; Manhattan
 William Raymond Essick; Eureka
 Elsie May Ester; Peck
 Mabel L. Evans; Liberal
 Aleita Pauline Faley; Manhattan
 Lillian Elizabeth Faidley; Manhattan
 Sister Frances Antonia Fassenmyer;
 Leavenworth
 Arthur Roy Fehn; Manhattan
 Eloise Flanders; Manhattan
 Beatty Hope Fleenor; Manhattan
 Vernett Edward Fletcher; Manhattan
 Daisy Boswell Floyd; Manhattan
 Sister Mary Judith Flynn; Leavenworth
 George Albert Foltz; Oswego
 Frank Carl Foreman; Coldwater
 Addison Forrester; Manhattan
 Blanche Forrester; Manhattan
 Ralph Emerson Franklin; Horton
 Peter Cornelius Funk; Allen
 Mary Abigail Furneaux; Moran
 Gladys Lorena Ganshird; Manhattan
 Ruth Emma Gardenhire; Alma
 Walter David Gardner; Kansas City
 Ethel Victoria Garrett; Manhattan
 Roy Preston Garrett; Manhattan
 Sister Mary Josepha Geary; Leavenworth
 Ruth Naomi Gehr; Manhattan
 George Albert Gemmel; Manhattan
 Clarence Raymond George; Manhattan
 Ealom Jasper George; Concordia
 Mary Gerkin; Riley
 Mary Helen Gilbert; Manhattan.
- Emilie Gingrich; Wellsville
 Gladys Gist; Manhattan
 J. A. Glaze; Manhattan
 Clara M. Glendening; Circleville
 George F. Glendening; Circleville
 George McGrew Glendening; Circleville
 Adella Elizabeth Glenn; Manhattan
 Bertha Elizabeth Glenn; Manhattan
 Mary Alice Gordon; Manhattan
 Fannie Harriet Gorton; Manhattan
 Mary Graham; Manhattan
 Greeta Hazel Gramse; Perry
 Chester Eugene Graves; Manhattan
 Ivy Pearle Green; Manhattan
 Dora Grogger; Manhattan
 Claribel Florence Grover; Iola
 Garnet Vivian Grover; Iola
 Myrtle Annice Gungelman; Holton
 Bertha May Gwin; Washington
 Eva M. Gwin; Washington
 Dorothy E. Hadley; Topeka
 Belle Hagans; Manhattan
 Joseph Robert Hall; Kansas City
 Elida May Hand; Clay Center
 Ruth Anna Harding; Marion
 Miriam Ellen Harling; Manhattan
 Sister Mary Carmelita Harman;
 Leavenworth
 Claude B. Harris; Manhattan
 Freda Louise Haslam; Manhattan
 Ada Hankenberry; Manhattan
 Floyd Hawkins; Manhattan
 Elsie Ernestine Hawkinson; Lindsborg
 Edgar Sylvester Haworth; Sharon
 Ellen R. Haworth; Newton
 Gladys Marguerite Hayes; Riley
 Herbert H. Haymaker; Manhattan
 Dorothy Louise Heartburg; Manhattan
 Sister Mary Felix Hebert; Leavenworth
 Marjorie Elizabeth Heinrerrich; Clay Center
 Ruth Bernese Henderson; Alma
 Francis Augustin Hennessy; Fulton
 Ella Evangeline Henning; Smith Center
 Alta Sarah Hepler; Manhattan
 Susan Grace Herr; Medicine Lodge
 Ethel Bebe Hibner; Gardner
 Ross Wayne Hill; Manhattan
 Jackson Benjamin Hinds; Pleasanton
 Oralea Hinson; Stockdale
 Mary Hitch; Guymon, Okla.
 Orville Bryan Hoff; Kansas City, Mo.
 Gladys Evelyn Hoffman; Manhattan
 Lester H. Hoffman; Abilene
 Araminta Holman; Leavenworth
 John Hoover; Manhattan
 Richard Hopper; Manhattan
 Fred Harold Hull; Portis
 George F. Humphrey; Herington
 Argie May Hunt; Blue Rapids
 Walter T. Hunt; Manhattan
 Donald Hunter; Manhattan
 Ruth Evalyn Hurd; Freeport, Ill.
 Louis Edgar Hutto; Manhattan
 Edith Jones Iles; Manhattan
 Doris L. Jacka; Norton
 James Lawrence Jacobson; Kingman
 Edward John Jelden; Columbus, Neb.
 Louis Marion Johnson; Manhattan
 Blanche Crank Judd; Manhattan
 Anna E. Keyes; Manhattan
 Sarah Katrina Kimport; Dellvale
 Chester Anderson King; Emporia
 Eva Sarah King; Emporia
 Julia King; Manhattan
 Amanda Kirkpatrick; Montrose
 Bernice Wilson Klotz; Wilson
 Joseph Ralph LaMont; Manhattan
 Clay Forrest Lardo; Humboldt
 Poy Yueu Lim; Manhattan

SUMMER SCHOOL—continued.

- Edith Inez Lindley; Leon
 Hazel Marie Lindley; Leon
 Ethel Marian Lindsay; Perry
 Godfrey Fred Longhofer; Woodbine
 Geta Lund; Manhattan
 Dorothy Elizabeth Lush; Altamont
 Margaret Frances Lush; Altamont
 Robert Henry Lush; Altamont
 Bessie Lenore Lyman; Manhattan
 Grace L. Lyness; Walnut
 Hazel Alma Lyness; Walnut
 Elvera C. McCammon; Manhattan
 Ruth Marie McCleary; Axtell
 Sister Antonia McDonagh; Leavenworth
 Edna Lucile McElroy; Clay Center
 Ralph R. McFadden; Manhattan
 Nelle Drake McGrath; Manhattan
 Mary Teresa McKenna; Springfield, Mo.
 Sister Rose Catherine McKiernan;
 Leavenworth
 Cary Reid Machir; Kansas City, Mo.
 Geneve Madden; Horton
 Wilbur Samuel Magill; Topeka
 Duella May Mall; Manhattan
 Elva Ione Mall; Manhattan
 Carl Vincent Maloney; Kalamazoo, Mich.
 Paul Christoph Mangelsdorf; Atchison
 Daniel Claire Marshall; Kinsley
 Emily Irene Marshall; Kinsley
 Lee Webster Marshall; Manhattan
 Edgar Martin; Manhattan
 Leila Belle Martin; Stafford
 William L. Martin; Winfield
 Francis Hodgen Martling; Kansas City
 Hilery E. Mather; Manhattan
 Rex A. Maupin; Manhattan
 Calvin J. Medlin; Manhattan
 Bernice Ellen Miller; Horton
 Susan E. Millier; Tarkio, Mo.
 Hugh Roswell Miracle; Wamego
 Florence Irene Mirick; Otis
 Burnece Moore; Cleburne, Tex.
 Harry Allyson Moore; Manhattan
 Thomas Edwin Moore; Manhattan
 Tillie Moore; Junction City
 Lulu Vaughn Morgridge; Longton
 Eloise Morrison; Topeka
 William Clay Morrow; Manhattan
 Ross Davis Mowry; Manhattan
 Edith Mabel Muir; Salina
 Stella Constance Munger; Manhattan
 Walter Starbuck Munson; Utica, N. Y.
 Ruth Inez Murphy; Manhattan
 Alice H. Mustard; Manhattan
 Telie Edward Nafziger; McPherson
 Mrs. T. E. Nafziger; McPherson
 Blanche Mae Nason; Manhattan
 Clell Ansel Newell; Matfield Green
 Michael J. Nolan; Wichita
 Floyd Earl Oakes; Manhattan
 Howard Adams O'Brien; Luray
 Sister M. Sylvia O'Leary; Leavenworth
 Benedict Oliveria; Brazil
 Edlena O'Neil; Quindaro
 F. W. Osterhout; Lansing
 Flora Roccina Parker; Ottawa
 Nellie Maria Payne; Manhattan
 Fliger S. Pemberton; Junction City
 Frederick John Peters; Salina
 Tilford Ruddell Pharr; Manhattan
 Hervey Phipps; Manhattan
 Arthur Henry Platt; Manhattan
 Blanche Marie Platt; Manhattan
 Lael Louise Porter; Deadwood, S. Dak.
 Stephen Lee Potter; Manhattan
 Frances Price; Paola
 James Wendell Pryor; Kansas City
 Charles Lorin Quear; Atlanta, Ind.
 Chester F. Quear; Atlanta, Ind.
 Jerry Thomas Quinn; Manhattan
 Karl Spangler Quisenberry; Manhattan
 Alvario Navarri Ramos; Brazil
 Arthur Cecil Ramsey; Osage City
 Burton Reap; Manhattan
 Bruce David Reazin; Topeka
 Garnett W. Reed; Kansas City, Mo.
 Oliver B. Reed; Manhattan
 E. C. Rees; Girard
 F. A. Rhine; Cleburne
 Ernest Francis Robinson; Manhattan
 Howard Hardy Robinson; Washington
 William Ellett Robison; Towanda
 Alberta Roswurm; Manhattan
 Mona Agnes Rudy; Manhattan
 Winfield Foster Runyen; Topeka
 Sister Mary Ryan; Leavenworth
 Mary Margaret Ryan; Manhattan
 Orra Salmon; Manhattan
 Addie Ruth Sandman; Harline, Neb.
 Harry Weber Schaper; Mulvane
 Lois Wilma Schlaegel; Olsburg
 Margaret Ursula Schneider; Logan
 George Welch Sconce; Hoyt
 Myra Scott; Manhattan
 Zora Scott; Ransom
 Ursula S. Senn; Lasita
 Hazel Shellenberger; Manhattan
 Ralph J. Shidler; Girard
 Laura Edna Shingledecker; Manhattan
 Lillian Hazel Shoff; Wichita
 Marjory Hannah Simpson; Nowata, Okla.
 Leland Otis Sinderson; Manhattan
 Hazel A. Skidmore; Osage City
 Homer Joseph Sloop; Boyle
 Lola Mae Sloop; Boyle
 Dorothy Virginia Smith; Manhattan
 Grace King Smith; LeRoy
 Margie Smith; Manhattan
 Helen Imogene Smith; Kiowa
 Sister Mary Donata Smith; Leavenworth
 Rollin James Smith; Topeka
 Vesta Smith; Parsons
 Iva B. Spangler; Sharon
 Lenna Speer; Edmond, Okla.
 Clyde Leslie Spring; Manhattan
 Gertrude Frances Srack; Manhattan
 Frances Elizabeth Stall; Manhattan
 Jesse Gaylord Stanton; Wakeeney
 Florence Stauffer; Marion
 Marion Westley Stauffer; Marion
 Oscar Steanson; Oklahoma City, Okla.
 Millie Oltmans Stein; Halstead
 William Conrad Stein; Halstead
 Lillian Colene Stewart; Hamilton, Mo.
 Velda Elizabeth Stewart; Morganville
 Goldie M. Stollar; Mankato
 Marie Story; Manhattan
 Mayme Elizabeth Stout; Newton
 Kathleen Inez Stoutimore; Winfield
 Helen Strain; Clyde
 Iva Viola Strebel; Alton
 Girlie Marie Strowig; Paxico
 Violet Hope Stuart; Zeandale
 Clarina May Summers; Manhattan
 Lauretta Victoria Sumners; Manhattan
 Lillian Sumners; Manhattan
 Abbie D. Swafford; Manhattan
 Elsie Malvena Swanson; Manhattan
 Mabel Manghild Swanson; Manhattan
 Theodore T. Swenson; Lindsborg
 Harry Acid Swim; Severance
 Lucy Lillian Taylor; Fort Scott
 Mabelle LaVone Taylor; Zeandale
 Mary Fidelia Taylor; Newton
 Mary Hobbs Taylor; Fort Scott
 Neva I'Vene Taylor; Zeandale
 Ruby E. Taylor; Fort Scott
 Gertrude Doud Tetrick; Manhattan
 Corinne Bertha Thiele; Hanover

SUMMER SCHOOL—concluded.

Frederick D. Thomas; Garrison
 Kyle David Thompson; Densmore
 Mabel Thompson; Junction City
 Meryl Ethelyn Thornburg; Manhattan
 Mildred Hazel Thornburg; Manhattan
 Nellie Thornburg; Manhattan
 Rose Viola Tipton; McPherson
 Ernest Henry Tolin; Soldier
 Frank Raymond Townsend; Madison
 Ella Florence Travis; Iola
 Minnie Marie Ubel; Wamego
 John Bennett Underwood; Towanda
 Mark Florea Upson; Sabinal, Tex.
 Mary Laura Vaile; Brownell
 Aurolyn Agnes Vandivert; Iowa City, Iowa
 Hermione Alice van Laer; Topeka
 Winona Ethel Van Vleck; Rossville
 Perttu Hannes Virtanen; Manhattan
 Frances Elizabeth Washington; Montezuma
 Martha Coats Webb; Manhattan
 Susie Alice Weber; Logan
 Nannie Agnes Wesley; Bancroft
 Edward Staunton West; Manhattan
 Julia Marian Westgate; Manhattan
 C. Lucile Whan; Manhattan
 Albert Freeman Whisnant; Riley
 Frances Josephine Whitmire;
 West Plains, Mo.
 Emma S. Whitton; Kiowa
 Theina Geraldine Wilkerson; Topeka
 Alma Luella Wilkin; Manhattan
 Edna May Wilkin; Manhattan
 Cecil Williams; Olsburg
 John Cathcart Wilson; Manhattan
 Ruby Esther Wilson; Oklahoma City, Okla.
 William Clyde Wilson; Manhattan
 Mildred Henrietta Wismer; Pomona
 Lois Emily Witham; Manhattan
 Ethel Frances Wood; Manhattan
 Homer Carlton Wood; Manhattan
 Thomas M. Wood, Keats
 Maude Ellen Carter Woods; Tonganoxie
 Nellie Flo Yantis; Manhattan
 Lloyd D. Zimmerman; Manhattan

Students in Special Courses

The abbreviations following the names of students have the following significations: AMSC, automobile mechanics' short course; BSC, blacksmiths' short course; CSC, carpenters' short course; CCSC, commercial creamery short course; ESC, electrical short course; FSC, farmers' short course; HSC, housekeepers' short course; LRMSC, lunch-room management short course; MSC, machinists' short course; RSC, radio short course; SA1, School of Agriculture, first year; SA2, School of Agriculture, second year; SA3, School of Agriculture, third year; SASp, School of Agriculture, special; TOSC, tractor operators' short course; FBVE, Federal Board for Vocational Education (noncollegiate).

Jeremiah W. Abbott (AMSC);
 Fairbury, Neb.
 Walter Abell (TOSC); Oakley
 William Fred Adams (FBVE);
 Ridgeway, Mo.
 Jessie Adams Allingham (HSC); Manhattan
 Alfred Anderson (FBVE); Junction City
 Alfred E. Anderson (TOSC); Lindsay
 Arthur Emanuel Anderson (AMSC);
 Courtland
 Einer David Anderson (AMSC); Falun
 Fred John Anderson (TOSC); Kinsley
 Tilbert Sylvester Anderson (ESC);
 McPherson
 William A. Anderson (AMSC); Waterville
 Will Henry Angell (FSC); Portis
 Archibald Bertrand Armstrong (SASp);
 Manhattan
 Ross Howard Arneal (AMSC); Colby
 Fred Walter Artz (FBVE); Reger, Mo.
 Samuel Otis Deignon Arvin (FBVE);
 Wichita
 James Austin Ashley (FSC); Rexford
 Chester Gladstone Aument (FBVE);
 Junction City
 Bradley Overseeth Austin (SASp); Leoti
 Robert Allan Austin (FBVE); Oskaloosa
 Robert Harold Ayers (FSC); Centralia
 Francis Bernard Bailey (AMSC);
 Saguache, Colo.
 Rolland Paul Bailord (SASp); Marion
 George Marion Baird (AMSC); Formoso
 Paris Alonzo Baker (AMSC); Cullison
 Leonard Elbert Bales (FSC); Manhattan
 Paul Henry Ballance (AMSC); Minneapolis
 Frank Clark Ballard (AMSC); Dighton
 Louis Marvin Ballou (TOSC); Delphos
 Alvin Cornelius Banman (SASp); Hillsboro
 John A. Barkemeyer (FSC); Halstead
 Walter Russell Barr (FSC); Atlanta, Ill.
 Marion Richard Barr (SASp); Manhattan
 Louise Anna Barre (HSC); Tampa
 Reuel Vernon Barrington (SASp); Sedan
 Alexander Montgomery Barrow (TOSC);
 W. Collingwood, N. J.
 Russell Bartlett (FBVE); Stafford
 Cecil Louis Batchelder (TOSC);
 Citrusgrove, Tex.
 Lemuel Earl Bateman (FBVE); Oskaloosa
 Lawton Virnon Baugh (TOSC); Emporia
 Gilbert Emerson Baxendale (FBVE);
 Lincoln
 Raymond Gibbon Bayles (SASp);
 Manhattan
 Charles Louis Beal (SASp); Kinsley
 Menno A. Becker (AMSC); McPherson
 Paul Becker, Jr., (AMSC); White City
 Melvin Howard Beeth (TOSC); Carlton
 Drummond Allen Bell (AMSC);
 Yates Center

STUDENTS IN SPECIAL COURSES—continued.

- Frederick Bell (FBVE); Kansas City
 John Raymond Bengtson (FSC); Robinson
 John Vernon Benham (TOSC); Wellsville
 Howard Dale Bennett (SASp); Manhattan
 Clayton Stanley Bentley (SASp); Jerome
 Ronald Spencer Bentley (FSC); Jerome
 George I. Bergen (SASp); Manhattan
 Laura Selma Berger (HSC); Hanover
 Leith John Bergier (FBVE); Downs
 Herman H. Besthorn (AMSC); Bushton
 Edward Gail Betts (SA1); Detroit
 Adolph Louis Betz (FBVE); Alton, Ill.
 Dean Robert Billings (AMSC); Maple Hill
 Asa George Bird (FBVE); Fort Scott
 Ernest Alwyn Bird (FSC); Hope
 Elson Joseph Bishop (SASp); Glasco
 Robert D. Bishop (FSC); Wichita
 Wilber E. Bjork (BSC); Levant
 Roy Merideth Blackwelder (TOSC); Pratt
 Terrace William Blair (FBVE); Page, Neb.
 Katherine Gladys Blaylock (HSC);
 Smith Center
 Floyd Arthur Blegler (FBVE); Saxman
 Emery Blevins (SA1); Highland
 Loyd Blosser (SASp); Norway
 Leon Leslie Blystone (FBVE); Kanorado
 Charles Bobek (TOSC); Caldwell
 Robert Francis Boecker (AMSC); Parsons
 Preston Fay Bolenbaugh (TOSC);
 Enid, Okla.
 Walter Christ Boller (FBVE); Newton
 Earl Phil Bolton (FSC); Council Grove
 James Calvin Bones (AMSC); Norton
 Earl Everett Bonesteel (TOSC); Haddam
 Jessie Lucile Bouton (SASp);
 Medford, Okla.
 William Bowers (FBVE);
 Indianapolis, Ind.
 Edna Boydston (HSC); Sterling
 Glenn Arthur Bozarth (AMSC); Manhattan
 Ransom Duane Branch (SA1); Sterling
 Fred August Braun (TOSC); Council Grove
 Willie Jacob Braun (TOSC); Council Grove
 John Albert Bravence (FBVE); Rossville
 Earl Brazzel (AMSC); Purcell
 Everett Bretches (AMSC); Longton
 Walter Maurice Bretches (AMSC); Abilene
 Orval Albert Bricker (FBVE);
 Kansas City
 Anna Rosetta Briggs (SA2); Protection
 Henry David Briggs (SA1); Sedan
 John William Briggs (SASp); Protection
 Joe Bright (TOSC); Ackerman, Miss.
 Richard Henry Bron (FBVE); Wichita
 Clifford Leo Brown (TOSC); Quincy
 Walter Asa Brunson (AMSC); Wichita
 Hugh Brush (TOSC); Hallett
 Perry Wilbur Buchanan (AMSC);
 Leavenworth
 Chester R. Buckles (TOSC);
 Superior, Neb.
 Stanley Wayne Burgess (SASp);
 Manhattan
 Bryan Olen Burget (AMSC); Goff
 Clarence McKinley Burk (FSC); Clifton
 Roy Dalton Burlison (FBVE);
 Arcola, Mo.
 Frank Burns (FBVE); St. Louis, Mo.
 John Carl Louis Burre (FSC);
 Leavenworth
 Edward Henry Burton (FSC); Manhattan
 Thomas Martin Butler (SA2); Glasco
 Arch Wallace Button (FBVE);
 Quapaw, Okla.
 William Keith Butts (AMSC); Goff
 James Monroe Callender (SA2);
 Manhattan
 Matthew John Calto (FBVE);
 Columbus, Neb.
 Summer Hays Cammack (FBVE);
 McCune
 Benjamin Augustine Campbell (SA3);
 Morganville
 Daniel Raymond Campbell (AMSC);
 Leavenworth
 Earl D. Campbell (FBVE); Washington
 Robert Wellington Campbell (ESC);
 Wichita
 Walter Edward Canning (TOSC);
 Manhattan
 Joseph Edmund Caplis (FSC);
 El Paso, Tex.
 Arvid Oscar Carlson (FBVE); Overbrook
 Ethyl Olivia Carlson (SA1); Falun
 Susan Loretta Carmody (SASp);
 Manhattan
 Henry Jensie Carr (TOSC); Jamestown
 Snow Carr (AMSC); Olivet
 Henry M. Carsten (TOSC); Jennings
 Doyle Henry Carter (FBVE);
 Trenton, Mo.
 Edward Harner Casinger (FBVE);
 Kennett, Mo.
 Myron Glenn Cassidy (SASp);
 Manhattan
 Harriette Sarah Cates (HSC);
 Manhattan
 Bert M. Caughey (AMSC); Lenora
 John Wesley Cavender (FBVE);
 Wellsville
 Charlie Monroe Caviness (FBVE);
 West Plains, Mo.
 Gertrude Mae Childs (HSC); Republic
 Arthur Julius Christenson (TOSC);
 Jamestown
 Chris Paul Christensen (AMSC);
 Waterville
 Otis Roy Christian (FBVE); Manhattan
 Frank Brayton Clark (AMSC); Alden
 Josephine Clark (HSC); Junction City
 Mary Gladys Clark (SASp); Manhattan
 Jerome Elmer Clary (AMSC); Manhattan
 Bessie Ann Cleland (HSC); Hiattville
 Irvin Leonard Cleveland (TOSC); Larned
 Eugene Clevenger (FBVE); Cato, Mo.
 Arthur William Closson (FBVE);
 Portland, Iowa
 William Russell Clough (FBVE);
 Penelosa
 Dwight Dewitt Coffin (SASp); Salem, Ill.
 Philip Townsend Coffin (FSC); Scott City
 Lawrence Alten Cole (MSC);
 North Topeka
 Gertrude Myrtle Colton (SA2);
 Dover, Okla.
 Stephen Orvil Combs (FSC); Howard
 Albert Bryson Conaway (AMSC);
 Havensville
 Benjamin Joseph Conaway (AMSC);
 Havensville
 Ida Augusta Conrow (SA3); Manhattan
 William Amy Conrow (SASp); Manhattan
 Bernard John Conroy (SASp); Manhattan
 Ignatius Donald Conroy (SASp);
 Manhattan
 Earl Manly Cook (FSC); Dillon
 John Cook (FSC); St. Francis
 Lyman D. Cook (FSC); Beloit
 Robert Belden Cook (SA1); Manhattan
 William Edgar Cook (SASp); Cherryvale
 Robert Stanley Coon (AMSC); Manhattan
 Silas Cooper (FBVE); West City, Mo.
 Ralf Sampson Copenhafer (AMSC);
 Manhattan
 Metheny John Copeland (FBVE); Quinter

1. Tractor Operator, second 8 weeks; Blacksmithing and Carpentry, third 8 weeks.
3. Auto Mechanics Short Course, first 8 weeks.

STUDENTS IN SPECIAL COURSES—continued.

- Philip A. Corcoran (FBVE); Kansas City
 Jesse Earl Coslet (FBVE); Waverly, Mo.
 Harry Albert Cossel (AMSC); Glasco
 Albert Lee Costello (FBVE); Topeka
 August Albert Cowling (AMSC);
 Leavenworth
 William Earl Crail (TOSC); Fort Dodge
 Creston George Cramer (AMSC);
 Kanorado
 George Crandall (SA1); Kingman
 Fred Cravens (FSC); Medicine Lodge
 Frank Marrison Crawford (AMSC);
 Midland, S. Dak.
 Ray Creamer (FBVE); Dixon, Mo.
 Kenneth Calvin Creswell (AMSC);
 Minneola
 George Cross (FSC); Goddard
 Ruth Brown Crowson (SASp); Manhattan
 William Burbank Crowthers (FBVE);
 Philadelphia, Pa.
 Harold William Curry (AMSC);
 St. Francis
 Robert Lincoln Curtis (FBVE); Stafford
 Guiseppe Cutitta (FBVE);
 Kansas City, Mo.
 Charles Francis Cyr (FSC);
 Franklin, Neb.
 Erling Dahl (SASp); Montrose
 Marion Clifford Danby (MSC); Cassoday
 Orville Darling (FBVE); Norton
 Russell Dewey Davault (FBVE);
 St. Louis, Mo.
 Keith Burnett Davidson (SASp); Glasco
 Rice Davies (FSC); Liberal
 Edgar William Davis (FBVE); Lyons
 George Willis Davis (AMSC); Eskridge
 Robert Ivan Davis (ESC); Enid, Okla.
 Orville Thomas Deadman (TOSC);
 Manhattan
 William L. Debbrecht (AMSC); Andale
 Edwin Forrest Debo (TOSC);
 Marshall, Okla.
 Frank Irwin Decker (AMSC);
 Birmingham
 Martha Livingston Denny (HSC);
 Manhattan
 Clyde E. Dent (FSC); Council Grove
 Albert Ellsworth Derby (AMSC);
 Fort Worth, Tex.
 Curtis William Dickson (MSC);
 Woodston
 Bennie Henry Diehl (TOSC); Enterprise
 Sadie Jane Diehl (HSC); Enterprise
 Olin Love Dikeman (AMSC); Niotaze
 Charles Orville Dirks (FBVE); Latham
 John Armstrong Dirks (SA1); Latham
 Leon Dixon (FSC); Holton
 Mrs. H. E. Dodge (HSC); Leoti
 Lewis Edward Dollison (FSC);
 Council Grove
 Dayrel Elijah Dove (ESC); Severy
 Alan Metzler Downey (SA1);
 Kansas City, Mo.
 Erwin Parker Drake (FSC);
 Wagoner, Okla.
 William Roy Drennon (FBVE); Topeka
 William Apple Dresser (FSC); Piper
 William Dreyer (TOSC); Kiowa
 Clancy Harry Duke (TOSC); Dighton
 George Wilson Duncan (FSC); Flush
 Arlie Duree (FBVE); Leavenworth
 Giles Norton Dye (FBVE); Salina
 Ray Edward Early (SASp); Topeka
 Samuel M. Eby (FBVE);
 Marshalltown, Iowa
 John Charles Eckart (TOSC); Manhattan
 Ernest Edward Egger (AMSC); Ellis
 Clark Trevator Eimer (FBVE); Blair
 Evelyn S. Ellis (SA1); Friend
 Lester L. Elder (TOSC); Woodston
 Frank Shields Elliott (FSC); Reece
 Vernon Morgan Edmiston (FSC);
 Coffeyville
 Ross Smith Emmons (FBVE); Joplin, Mo.
 James Endicott (FBVE); Ethel, Neb.
 Clarence Victor Erickson (TOSC); Clifton
 Charles Esslinger (FSC); Madison
 Alfred Lealand Evans (TOSC);
 Miltonvale
 Marlin D. Evans (AMSC); Rossville
 Ray Hunter Ewalt (SASp); Manhattan
 Alfred Fankhauser (FSC); Madison
 Minnie Metta Fankhauser (SA2);
 Madison
 Arlie Wayne Farrar (MSC); Lyndon
 Howard Grier Faulkner (FSC);
 Leavenworth
 Charles Willard Fay (FBVE);
 Manhattan
 John Fred Feldhus (FBVE);
 St. Louis, Mo.
 Herbert Gillespie Ferguson (AMSC);
 Gypsum
 Robert Emmett Field (FBVE);
 Leavenworth
 Daniel Figg (FBVE); Wheeling, Mo.
 George Michael Fisher (SA1); Holton
 Henry Charles Fisher (AMSC); Blue Hill
 Charles Raymond Fitch (FBVE).
 Miltonvale
 Dennis Fitzgerald (TOSC); Manhattan
 Clarence E. Fix (AMSC); Minneapolis
 Joseph Henry Flack (AMSC); Maple Hill
 Irene Elizabeth Fleming (LRMSC);
 Emporia
 Anna Mae Fletcher (SA1); Rock Creek
 Vernett Edward Fletcher (SA3); Manhattan
 Fritz Richard Flottman (FBVE); Burden
 Grace Rebecca Foltz (SA2); Wakarusa
 James Eugene Foote (FSC); Fulton
 Arthur Wesley Ford (BSC); Manhattan
 Jess J. Ford (AMSC); Manhattan
 Robert Miles Forrester (SASp); Manhattan
 Thomas James Fowler (FBVE);
 Muscatine, Iowa
 Paul Clifford Frank (AMSC); Manhattan
 Otis Lester Franklin (AMSC); Hepler
 Roy Henry Freed (TOSC); Loomis, Neb.
 Claude Melvin Freeman (ESC); Blue Mound
 Emanuel Fromm (FSC); Elma
 Lyle Burton Frost (AMSC); Manhattan
 Guy James Fulcher (AMSC); Lansing
 Donald Hall Fulton (SASp); Manhattan
 William F. Furnas (AMSC); Sharon
 Junius Alan Gaddis (AMSC); Parsons
 Arthur Gallemore (FBVE); Seneca, Mo.
 Lena Emma Ganstrom (HSC); Hollis
 John Clarence Gard (FBVE); Dwight
 Chester Clarence Gardner (FBVE); Iola
 Leland Edwin Gardner (TOSC);
 St. Francis
 Loyd William Garner (AMSC); Manhattan
 Ada Rosetta Gates (HSC); Hill City
 Lewis S. Geckeler (FSC); Independence
 Marie Josephine Gehrke (HSC); Herington
 Gienn Edward Gentner (AMSC); Leoti
 Ralph Emerson George (AMSC); Earlton
 Ellen Fredericka Gerhard (HSC); Girard
 Robert Orel Giffin (TOSC); Burlington
 Kenneth Gilbert (FSC); Liberal
 Theodore R. Gill (SASp), Manhattan
 Karl Arthur Glatt (SASp); Enterprise
 Edwin Kinsley Glover (SASp); Manhattan

STUDENTS IN SPECIAL COURSES—continued.

- ⁵ Herbert Albert Goering (ESC); Moundridge
Emilio Vazquez Gomez (SASp);
San Antonio, Tex.
John I. Goodrum (FSC); Mayfield
Samuel L. Gorham (FSC); Garden City
Francis John Gorman (TOSC); Hartford
William Joseph Gorman (TOSC);
Neosho Falls
Otis J. Gould (SA3); Manhattan
Emmett Stanley Graham (SASp);
Manhattan
Lola Jane Graham (SASp); Manhattan
Clair Emerson Green (FSC); Lyndon
William Elijah Green (FBVE);
Fordland, Mo.
Henry Greenfelder (FBVE); Grandin, Mo.
John Greene (SASp); Genoa, Colo.
Charles Gregory (TOSC); Devizes
Alfred Eugene Griffith (FSC); Pratt
Earl Grumme (TOSC); Clay Center
Julius Wayne Grutzmacher (AMSC);
Westmoreland
Victor Albert Guerin (FBVE);
St. Joseph, Mo.
Ralph Clarence Gugler (AMSC); Ellis
Lewis John Guides (AMSC); Fairview
Rexford Guipre (SASp); Simpson
Theodore Earl Guss (FSC); Coldwater
William W. Haas (BSC); Navarre
Elta Haegre (HSC); Manhattan
Amanda Amelia Hafenstein (HSC); Alma
Frank Alexander Hagan (SA2); Manhattan
Sterling Harold Haist (FBVE);
Kansas City, Mo.
Carl Henry Halberg (SA1); Ottawa
James Wren Hale (SASp); Miami, Tex.
Ralph Earl Hale (AMSC); Miami, Tex.
Geneva Mary Hall (HSC); Topeka
Joseph Robert Hall (SASp); Kansas City
William Thomas Hall (FSC); Edwardsville
Robert Andrew Hamill (SASp); Colby
John Dewey Hardesty (TOSC); Pratt
Harriet Michael Hardin (SASp);
Manhattan
Alverda Mae Hare (HSC); Lamar, Colo.
Hubert Hamilton Harmon (TOSC);
Lawrence
Dennis Kendall Harper (FBVE);
Manhattan
Arthur E. Harr (AMSC); Greenleaf
⁵ George Andrew Harrah (SASp);
Kansas City, Mo.
Glynn Wayne Harris (SASp); Bennington
Mervin Samuel Harris (AMSC);
Kansas City
Roy Charles Harreson (FBVE); Satanta
Ralph Lawton Hartley (AMSC); Norton
Wilma Gwendolyn Hartley (SASp);
Manhattan
Carl Hartman (SA1); Manhattan
Charles Phillip Hartman (AMSC);
Mont Ida
Louis Worden Harvey (TOSC); Manhattan
Warren Veach Harvey (TOSC); Manhattan
Herman Haupt (AMSC); Glen Elder
Howard Marshall Hautz (AMSC);
Scott City
Norma Elizabeth Hawk (SA1); Manhattan
Zariel Griffith Hawk (AMSC); Walton
Walter B. Hayen (TOSC); Marion
Floyd William Hayes (FSC); Bronson
Harry Winfred Haynes (SA1); Grantville
Garnett Prudence Heath (LRMSC);
Junction City
Fannie Lee Heath (HSC); Manhattan
Myrtle Heath (HSC); Kinsley
Ernest Marion Hebrank (SA1);
Council Grove
Edwin Hedstrom (SA3); Manhattan
Herbert Christian Heinzman (AMSC);
Manhattan
John Hench (TOSC); Ransom
Paul Hendricks (TOSC); Glen Elder
Esther Ione Hendrix (HSC);
Kansas City, Mo.
William Alexander Hendrix (AMSC);
Modoc
Jessie James Hennon (FBVE); Sterling
Ross Dale Hensley (SA1); Moscow, Idaho
Christie Cynthia Hepler (SASp);
Manhattan
Caldwell Valdemar Hessin (SASp);
Manhattan
Roscoe Easter Hey (ESC); Overbrook
Marion George Hiatt (FBVE); Norton
Joseph Francis Hickert (AMSC); Clayton
Howard William Higbee (FSC); Fall River
Henry Albert Hildenbrand (AMSC); Bala
Jefferson Milton Hill (FBVE);
Russellville, Ala.
Randall Conrad Hill (SA3); Manhattan
Joe Edward Hitt (FSC); Collyer
Earl Nelson Hittle (TOSC); Silver Lake
Harley James Hixon (FBVE); Dearing
Gladys Ophelia Hofmann (HSC);
Manhattan
Louie E. Hollingsworth (AMSC);
Geuda Springs
Virgil Braxton Hollingsworth (FSC);
Hunnewell
John Stephen Holloway (AMSC);
Lecompton
William Gerald Holloway (FBVE);
Lecompton
Thomas Van Holmes (SASp);
Los Angeles, Cal.
Emil Henry Homolka (FBVE);
Manhattan
Earl Robert Honeywell (SASp);
Manhattan
William Madison Hopkins (AMSC);
Brookville
Carl Hopp (SA1); Oronogo, Mo.
Roderick White Hopper (SA1); Manhattan
Charles Orville Horchem (TOSC); Ransom
Pete Horchem (TOSC); Ransom
Harold Hubert Horton (SA1); Richland
Wright Merritt Horton (FSC); Madison
⁶ Theodore William Howland (BSC);
Ludell
Charles Grant Hoyt (TOSC);
Junction City
Hobart Leonard Hoyt (AMSC); Lyons
Everett Elmo Hughes (AMSC); Oak Hill
Camilla Mae Huling (LRMSC); Topeka
Harold Bernreuter Humburg (SA3); Bison
George F. Humphrey (FBVE);
Longdale, Okla.
Ira Maxwell Hutchison (TOSC);
Forest Hill, W. Va.
Frederick Oswald Imhoff (FSC); Hanover
Herbert Atlee Irwin (FSC);
Conway Springs
Glenn Charles Isaac (FSC); Elsmore
Charles Robertson Jackson (BSC);
Coldwater
George B. Jackson (AMSC); Garnett
George Jacobs (FBVE); La Crosse
Peter Fred Jacobsen (FBVE);
Moville, Iowa

3. Auto Mechanics Short Course, first 8 weeks.

5. Blacksmithing Short Course, first 8 weeks.

6. School of Agriculture, first year, first semester.

STUDENTS IN SPECIAL COURSES—continued.

Gurner Arthur Jevons (TOSC); Wakefield
 David William Jewett (FSC); De Soto
 Carl William Johnson (FSC); Little River
 Dorothy Elizabeth Johnson (HSC); Beloit
 George Phillip Johnson (AMSC);
 Manhattan
 Laida Ward Johnson (HSC); Osage City
 Lillie Marie Johnson (SA1); Walsburg
 Lula Anette Johnson (SASp); Walsburg
 Maurice Calvin Johnson (FSC); Wakarusa
 Myrtle Naomi Johnson (SASp);
 Leonardville
 Victor Emanuel Johnson (TOSC);
 Leonardville
 William Carl Johnson (SA1); Salina
 Donald Calhoun Jones (TOSC); Manhattan
 Hugh Louis Josseland (SASp); Copeland
 Floyd Cecil Justice (SA1); Fall River
 Oscar Allen Karnis (AMSC); Studley
 Donald Walker Karr (AMSC); Gridley
 Harry Elzworth Keener (FBVE); Argonia
 Paul Weisner Keith (TOSC); La Cygne
 Harvey J. Kelling (FSC); Cedar
 * James Lex Kelly (FSC); Corbin
 Ralph Scott Kendle (TOSC); Council Grove
 John A. W. Kennedy (SASp);
 Junction City
 Robert George Kersey (AMSC);
 Westmoreland
 Charles James Keyes (SASp); Manhattan
 Russell Stanley Kifer (FBVE);
 Springfield, Mo.
 Cyrus Theodore Kimball (TOSC);
 Eskridge
 John William Kimple (TOSC); Coldwater
 Clarence Leo King (CCSC); Hays
 Eva Sarah King (SASp); Emporia
 * Herbert Adam Kinman (SASp);
 Kansas City
 Roy Taylor Kinman (SA1); Ashland
 Samuel Frederick Kinsinger (TOSC);
 Ness City
 Vesta Eulela Kinyon (HSC); Manhattan
 * Ruth Marguerite Kirkendall (SASp);
 Wichita
 Scott James Kirkpatrick (AMSC); Webber
 David Charles Klemm (FBVE);
 Piney, Ark.
 Andrew Thomas Knapp (TOSC);
 Leavenworth
 Benjamin Niles Kneeland (AMSC); Kismet
 Edward Franklin Knepp (AMSC);
 Louisburg
 Peter Knight (FBVE); Savannah, Ga.
 Wilbur Clarence Knight (SASp);
 Manhattan
 Guy Perry Knisely (SASp); La Cygne
 Curtis Arnold Koch (AMSC); Westphalia
 Edna Mary Kohler (SASp); White City
 Edward E. Kohler (AMSC); White City
 Ernest Kohler (SA2); Forest Park, Ill.
 Lillian Kohler (SA2); White City
 Louise Anne Krigbaum (FSC); Topeka
 Roy C. Kronvall (AMSC); Winona
 Elmer Henry Kruger (MSC); Sylvan Grove
 Wendell D. Kunz (AMSC); Kimball, Neb.
 Henry A. Kurtz (FBVE); Burlington
 Louie Henry Kurz (AMSC); Clay Center
 James Clark Lane (TOSC); Yates Center
 Edwin Langenwaller (FSC); Halstead
 Thomas Miller Larsen (SASp);
 Kansas City
 Carl Oscar Emanuel Larson (FSC); Riley
 Clara Christina Larson (SASp); Topeka
 Emma Larson (SASp); May Day
 Ernest Larson (AMSC); Clay Center
 Louis Lauretson (SA1); Kansas City
 Edna Carol Lee (HSC); Louisburg
 Richard Frederick Lee (FBVE);
 Popular Bluff, Mo.
 Albert Edwin Legler (FSC); Leona
 Everett A. Lewis (TOSC); Larned
 Dewey Lilly (TOSC); Olivet
 Percy Claude Lilly (AMSC); Olivet
 Louis Fred Lindberg (TOSC); Vesper
 Enfred Gusstaf Lindholm (AMSC);
 Lindsborg
 George Daniel Lingelbach (SASp);
 Minneola
 Bonnie Lingenfelter (HSC); Fredonia
 Clarence John Linnebin (AMSC);
 Goddard
 Orville Henry Livingston (FBVE);
 Oakley
 Fred Richard Lloyd (TOSC); Oak Hill
 William Jess Lloyd (AMSC); Eskridge
 Maude Edrie Lohman (HSC); Topeka
 Ellis Long (FSC); Fredonia
 Jesse Chester Long (SASp); Manhattan
 William Clair Long (FSC); Madison
 Charles Henry Loomis (FSC); Merriam
 Rudolph Lundeen (AMSC); McPherson
 John Fred Luthi (FBVE); Junction City
 Vernon Andrew Luthy (AMSC); Sharon
 Walter Henry Lutz (SASp);
 Sharon Springs
 Arthur McAlister (TOSC); Moline
 William Harley McAlpin (FBVE);
 Silvis, Ill.
 Rodney Harold McCollum (FSC);
 Elmdale
 Roy Dewey McClure (FBVE); Hugoton
 Walter Burnett McCollum (TOSC);
 Redfield
 Alva Galen McDaniel (AMSC); Hepler
 Carroll William McDonald (SASp);
 Plainville
 Albert McDysan (FBVE); Plains
 John Buel McFadden (AMSC);
 Manhattan
 Floyd Lester McIrvin (TOSC);
 Geuda Springs
 Clarence Dale McKee (SASp); Manhattan
 Samuel Ralph McKee (FSC); Rexford
 Arthur Eugene McLeod (BSC);
 Belle Plaine, Iowa
 Neil Patrick McLean (FBVE); Paola
 James Alfred McNamee (TOSC);
 Junction City
 Cleo J. McNay (TOSC); Peabody
 Samuel Louis McNay (TOSC);
 Manhattan
 Henry Eugene McNutt (FBVE);
 Bucyrus
 Earl Jeremiah McWilliams (FBVE);
 Alta Vista
 Clarence Martin Machmer (TOSC);
 Wakefield
 Harold Warren Machmer (TOSC);
 Wakefield
 Oscar Mack (FBVE); Ottumwa, Iowa
 William E. Mackender (SASp); Riley
 Leo Ripley Maguire (FBVE); Geneseo
 Frank Raymond Mahaffey (FBVE);
 Riceville, Iowa
 Adolph Daniel Mall (CSC); Clay Center
 Chris John Mall (AMSC); Clay Center

4. Tractor Operator Short Course, first 8 weeks.
7. Housekeepers' Short Course, first semester.
3. Auto Mechanics Short Course, first 8 weeks. .

STUDENTS IN SPECIAL COURSES—*continued.*

- William Henry Malone (FBVE);
Fort Scott
- Lloyd Cecil Mann (FBVE);
Des Moines, Iowa
- Myrle Mann (FSC); Mildred
- Fred W. Manthe (TOSC); Fostoria
- Verner Donelson Maring (AMSC);
Detroit
- Robert Dale Mark (TOSC); Coldwater
- Glenn Wheeler Markley (AMSC);
Augusta
- Lee Webster Marshall (SASp);
Manhattan
- James Francis Martin (FBVE); Adams
- Wilson Marion Martin (FBVE);
Dunavant
- Joaquin B. Martinez (SASp);
Mercedes, P. I.
- George P. Masquot (FBVE); Horton
- Albert Emile Matthey (SASp); Merriam
- Hazel Irene May (SASp); Manhattan
- William Clyde May (SASp); Manhattan
- Willie Ralph Mayer (AMSC); Alta Vista
- Edith Allene Mayfield (SASp); Manhattan
- Cecil Ione Medlin (SASp); Manhattan
- Gerald David Meek (SASp); Topeka
- John Henry Meek (SA3); Idana
- Paul Miller Meek (TOSC); Centralia
- Joseph Leo Melroy (TOSC); Norton
- Martha Mary Menssen (HSC); White Cloud
- Joseph Bailey Merwin (TOSC); Kinsley
- William Hozea Messenger (SASp);
Manhattan
- Raymond Bertrund Messing (SASp);
Ashland
- Herman Dennis Metz (SA3); Manhattan
- Merlin Everett Meyer (AMSC); Sabetha
- Jay Russel Michael (AMSC); Cullison
- Ralph Ore Michael (AMSC); Cullison
- Oliver Harrison Mickey (FBVE); Wichita
- Buford John Miller (SASp); Piedmont
- Cecil Miller (FBVE); Manhattan
- George Dewey Miller (FBVE); Henley, Mo.
- George Duane Miller (FBVE); Nortonville
- Helen Gould Miller (SASp); Manhattan
- J. Philip Miller (TOSC); Utopia
- Elisha Paul Milton (FBVE); Larned
- Fred Milton (TOSC); La Cygne
- Nelson Houston Mock (AMSC); Anthony
- William Martin John Mockler (FBVE);
Edwardsville, Ill.
- Haro Krine Mohlman (SASp); Manhattan
- Lawrence Christ Molzen (TOSC); Newton
- Charles Joshep Moore (SASp);
Pine Bluff, Ark.
- Freeda R. Moore (HSC); Morland
- Homer Vincil Moore (FSC); Mont Ida
- John Louis Moore (FBVE); Fredonia
- Lloyd Burton Moore (TOSC); Burlington
- Roscoe Foster Moore (AMSC); Maple Hill
- James Harry More (TOSC); Anness
- Albert Wesley Morris (FBVE); Parsons
- Alva Barney Morris (FBVE); Topeka
- Robert Merton Morrison (MSC);
Phillipsburg
- Rowland Clark Morrow (AMSC);
Leavenworth
- Nellie Frances Morse (HSC); Guilfoil
- Frank S. Moss (FSC); Beloit
- William Thomas Mullen (FBVE);
Densmore
- Eugene Lawrence Mullender (AMSC);
Waldo
- Lyall William Mullendoe (FBVE);
Clearwater
- Benjamin Richmond Mulnix (FBVE);
McPherson
- Alvin Frederick Munson (AMSC); Burdick
- Elmer Ellsworth Murphy (AMSC);
Maple Hill
- J. Kenneth Muse (SASp); Manhattan
- Louis Henry Mussman (FBVE);
Augusta, Mo.
- Ona Vashiti Muxlow (SASp); Manhattan
- Walter Erret Myers (AMSC); Winfield
- Charles Browning Nabb (FBVE);
Yates Center
- Frank Ernest Naden (AMSC); Lyons
- Ezra Edwin Naffziger (ESC); Columbus
- Walter Tjaart Nanninga (AMSC); Bala
- Orin Edward Nay (FBVE);
Kansas City, Mo.
- George Howard Nebb (TOSC); Glen Elder
- William Curtis Neely (AMSC); Parsons
- Eugene Neff (FBVE); Salina
- Alton Harry Neill (FBVE); St. John
- Harry Homer Neill (AMSC); Fredonia
- Carl F. Nelson (BSC); Smolan
- Carl Otto Nelson (FBVE); Agenda
- Louise Nelson (HSC); Moray
- Myrtle Nelson (HSC); Manhattan
- Sadie Emelia Myrtle Nelson (SA1);
Keats
- Ruth Fowler Nettleton (SA1); Chanute
- Carl Chester Neuer (SASp);
Kansas City, Mo.
- Carrie Aileen Neusbaum (SASp);
Manhattan
- Elwin William Niecum (MSC);
North Topeka
- George Thomas Nicholson (FBVE);
Hutchinson
- Owen Daten Nicolay (FBVE); Osage City
- Walter Nieder (RSC); Lone Star
- Lorenz Nielsen (AMSC); Emporia
- Sam Nightengale (AMSC); McPherson
- Reinhardt Noll (FSC); Ransom
- Bertha Sophia Nordgren (HSC); Olsburg
- Georgiana Norris (SA2); Hutchinson
- Onie Linsey Norton (SA3); La Cygne
- Bernice Bridwell Oakes (HSC); Manhattan
- Francis Ronald Odette (AMSC);
Garden City
- William George O'Brien (SASp);
Omaha, Neb.
- Gustav O'Donnell (FBVE); Harvey, Ill.
- Joseph O'Donnell (AMSC); Green
- Ralph Marcus O'Donnell (SASp);
Medford, Okla.
- Carl Clinton O'Hara (FSC); Partridge
- Floyd Robert Oliver (SASp); Neodesha
- Carl Conrad Olson (FSC); Angola
- Carl William Olson (TOSC); Brookville
- Clifford Roswell Olson (TOSC); Clyde
- Eben Carl Olson (TOSC); Marquette
- Edwin C. Olson (ESC); Clyde
- Hazel Verne Olson (SA1); Dwight
- Nels Peter Olson (SASp); Brookville
- Otto Olson (AMSC); Leonardville
- Emmet Gerherd Oltjen (FSC); Leona
- Patrick Leo O'Meara (TOSC);
Council Grove
- Harold Temple O'Neil (SASp); Winfield
- Herbert Orval O'Neal (FBVE); Nashville
- Purl Harvey O'Neal (FBVE); Dillon
- Fred Phillip O'Neil (FBVE); Kansas City
- Mary Elizabeth O'Neil (SASp); Prescott
- Howard L. Orr (SASp); Hammond
- John W. Otto (AMSC); Haven

4. Tractor Operator Short Course, first 8 weeks.

8. Auto Mechanics Short Course, first semester.

STUDENTS IN SPECIAL COURSES—*continued*.

- Francis Millard Outlier (FSC);
Homestead, Okla.
William Joseph Overton (SASp);
Lees Summit, Mo.
Charles Edward Paden (AMSC); Lenora
Arthur Bretton Palmer (AMSC); Winfield
Elmer Lee Palmer (FBVE);
Kansas City, Mo.
Albert Tilden Parker (FBVE); Kirwin
Mary Florence Parr (LRMSC); McPherson
John W. Parrish (FSC); Derby
Newton John Parrish (AMSC); Larned
Richard Harry Parsons (FSC);
Arkansas City
Alfred Milton Patterson (TOSC);
Manhattan
George Walter Patterson (SASp); Clifton
George Francis Payne (FSC);
Weatherford, Okla.
William Fayne Peek (SASp); Manhattan
Fliger S. Pemberton (FBVE);
Junction City
William Russell Pendleton (SASp);
Manhattan
Julian Davis Pennington (TOSC); Edna
Harry Perkins (AMSC); Manhattan
Peyton Ira Perkins (AMSC); Conway
William Fred Perkins (SASp); Oswego
Curtis Reinard Peterson (TOSC);
Lost Springs
Delpha Peterson (HSC); Walsburg
Harry Albert Peterson (TOSC); Topeka
Benjamin F. Pfister (SASp); Fort Scott
John Newton Hagan Phlegar (FBVE);
Russell
Edna Marie Pieman (HSC); Vassar
Lenna Pierce (HSC); Minneapolis
Clarence A. Pittenger (AMSC); Blaine
Leslie Pittenger (AMSC); Blaine
Charles Richard Pittman (FBVE);
Brunswick, Mo.
Leslie Hopper Pitzer (TOSC); Pratt
Norman Vincent Plummer (SASp); Horton
Harold Thornton Poland (AMSC);
Junction City
Rosella Charlotte Pollard (LRMSC);
Manhattan
Carl Polson (MSC); Baileyville
Armer Porter (FBVE); Fredonia
Ray Porter (FBVE); Enterprise
William Bernhard Porter (BSC);
Alvin, Tex.
Hermine Alma Johanna Postier (HSC);
Inman
Le Sette Mal Vena Postier (HSC); Inman
Martha Caroline Marie Postier (HSC);
Inman
Julia Carrie Pottenger (LRMSC);
Jeffersonville, Ind.
Carrie Agnes Povenmire (HSC); Gridley
Frank A. Povenmire (TOSC); Gridley
⁸ Russell Meredith Prescott (SASp);
Parkerville
Ben Ferguson Price (FSC); Reading
Mary M. Price (SASp); Mound Valley
Joseph Henry Priot (FBVE); Case, Mo.
Mildred Pritchard (HSC); Junction City
Albert John Pruitt (AMSC); Goddard
Basilio Orpilla Pulanco (SASp);
Union, P. I.
Lawrence Francis Quaney (TOSC);
Ozawkie
Paul Swart Quick (FBVE); Quick City, Mo.
- Henry Patrick Quinn (SASp); Manhattan
Charles Steed Raffington (SASp);
Hutchinson
Frank Merritt Rainey (SASp); Alma
James Harry Ramsey (SA3); Colony
Melvin William Randle (TOSC); Stockton
Rasmus Leonard Rasmusson (TOSC);
Lindsborg
Harry Porter Rector (AMSC); Winona
Orie Adelbert Reddick (CCSC); Holton
Christine Ross Redmond (HSC); Topeka
Ethel Marie Redman (HSC); Kiowa
Raymond Victor Reece (TOSC); Oxford
Willis D. Reed (TOSC); Stockton
Peter Kenneth Regehr (TOSC); Hillsboro
⁹ Cornelius Pete Regier (FSC); White Water
Gustav Regier (FSC); Moundridge
John L. W. Regier (AMSC); Moundridge
Ralph J. Reich (FSC); Downs
Willie E. Remple (BSC); Hillsboro
Earl Joseph Reinin (AMSC); Barnes
William Edward Reynolds (FBVE);
Duplo, Ill.
Lyle Verne Rhine (BSC); Cleburne
Clarence Raymond Rice (TOSC); Olpe
Edward E. Rice (AMSC); Greenleaf
Floyd Rice (ESC); Delphos
Lorenzo Rice (AMSC); Kansas City
Carl Ernest Richardson (ESC); Barclay
Clinton Richardson (FSC); Stafford
Edward Stanton Riley (TOSC); Willard
Leo Fred Riley (SA1); Manhattan
¹⁰ India Reinhold (SASp); St. Francis
Alvin Verne Ritts (SASp); Topeka
Andrew Dean Robb (TOSC); Topeka
Millard Fillmore Roberts (FBVE); Marion
Charley Lee Robinson (FBVE); Downs
Warren Homer Robinson (FSC);
North Topeka
Nell Roderick (SASp); Manhattan
August William Roediger (AMSC);
Wakefield
Bernhardt William Roepke (FSC); Barnes
Samuel Nicholas Rogers (SA1); Manhattan
Lawrence Edward Rogler (FSC);
Matfield Green
Nicol Gosler Rogler (SASp); Matfield Green
Helen La Dema Rolley (HSC); Holton
Glen Victor Romig (FSC); Topeka
LeRoy Everett Root (FBVE); Ozawkie
Claude Parke Rose (FBVE); Fort Scott
Rudolph Frederick Rose (AMSC); La Cygne
Carl Arther Rostina (AMSC); McPherson
Alberta Roswurm (SA3); Manhattan
Glen Frederick Rotchford (AMSC);
Council Grove
Nellie May Rowe (SASp); St. John
Vance Mather Rucker (SASp); Bardett
Ruth Wilma Rudolph (HSC); Lawrence
Edgar Earl Rundell (TOSC); Stafford
Paul Albert Runquist (TOSC); Falun
Troy Rushing (FBVE); Tylertown, Miss.
Arthur LeRoy Russell (FBVE); Peabody
Grace Elizabeth Russell (HSC); La Crosse
Homer Wesley Russell (AMSC); Wamego
Stanley Dewey Russell (SASp); Winfield
George Wesley Rutz (AMSC); Hope
Katherine Ryan (SA1); Manhattan
Fred H. Sachau (AMSC); Manhattan
Harry James Sallee (FBVE); Long Island
Orra Salmon (SASp); Manhattan
Rufino Andres Salvatierra (SASp);
Santo Domingo, P. I.

3. Auto Mechanics Short Course, first 8 weeks.

9. Carpenters' Short Course, first 8 weeks.

10. Housekeepers' Short Course, first 8 weeks

STUDENTS IN SPECIAL COURSES—continued.

- Earnest Clarence Sander (AMSC); Hilltop
 Lydia Esther Sandow (SASp); Dillon
 Francis C. Sanford (TOSC); Belleville
 Harold Sargent (SA1); Manhattan
 Steven Alfred Sargent (AMSC); Riley
 Fred W. Saterlee (FBVE); Junction City
 Ivan Virgel Sawyer (TOSC); Fairview
 Frances Elizabeth Scheu (HSC); Manhattan
 Leo Joseph Schilz (FBVE); Fulton
 Chris Michael Schlicher (FBVE); Vassar
 Harry Junior Schmidt (FBVE);
 Kansas City, Mo.
 Thurman Allen Schooler (AMSC);
 Hiawatha
 Jennie Bernice Schofield (SASp);
 Manhattan
 Andrew Frederick Schrader (BSC); Dillon
 Carl Christian Schrader (SA1); Dillon
 Jacob Carl Schwindt (AMSC); Olpe
 Ross Owen Scott (FBVE); Agra
 Isaac Wesley Seamands (FBVE);
 Joplin, Mo.
 Robert Seht (AMSC); Parsons
 Carl Ernest Seydell (SA1); Wichita
 Rolland Orville Shadday (FSC);
 Crestline
 Evelyn Gladys Sharp (SASp); Rogers, Ark.
 Charles D. Shaw (TOSC); McPherson
 John William Shaw (FSC); Haddam
 Sidney Clinton Shepherd (SASp);
 Trinidad, Colo.
 Veryl Colbert Sheppard (TOSC); Wellsville
 John Thomas Sherman (FSC); Leona
 Lawrence Lester Sherman (FSC); Leona
 Harry Shoebrook (FSC); Horton
 Alma Doriene Shore (SASp); Milan
 Chester Daniel Shupe (FSC); Sitka
 Ezra Isaac Sidebotham (FSC);
 Manhattan
 Howard Good Siebert (AMSC); Marion
 Albert William Siler (SASp); Fredonia
 Ernest Lee Siler (SASp); Wells
 Andrew Anton Simon (AMSC); Oakland
 Willard Robert Slaymaker (AMSC);
 Peabody
 John D. Smid (TOSC); Hazelton
 Joseph Earl Smid (SASp); Fowler
 Clarence Rothwell Smith (FSC); Bronson
 Claude Ervin Smith (FSC); Belle Plaine
 Houston Joseph Smith (SASp); Manhattan
 James Leroy Smith (FBVE); Gladden, Mo.
 Jerry Smith (FBVE); Kiowa
 Malcolm Melvin Smith (AMSC); Manchester
 Rupert Harold Smith (FSC); Delphos
 John Raymond Smithheiser (SA3);
 Danville
 Joseph James Smithheiser (TOSC);
 Danville
 John P. Snare (SA2); Ogden
 Jesse Elmer Snyder (FSC); St. John
 Roy Lee Snyder (TOSC); La Cygne
 Ralph L. Sours (SASp); Fall River
 Eddie Vincil Spaht (FSC); Elk City
 Vern Washington Stambaugh (TOSC);
 Maple Hill
 Levi Bryan Stants (SASp); Hope
 Jesse Gaylord Stanton (FBVE); Wakeeney
 Irvin Earl Stark (AMSC); Abilene
 Leo Melvin States (FSC); Logan
 Chester Wilbur Stead (AMSC); Emporia
 Lorin Earl Stead (AMSC); Emporia
 Howard Douglas Steele (AMSC);
 Manhattan
 Richard S. Steele (SASp); Winfield
 Roy August Steffen (AMSC); White Cloud
 Frank Bruce Stephens (FBVE);
 Greenville, Mo.
 Harold Ralph Stephens (FSC); Walnut
 Raymond John Sterbenz (TOSC);
 Hartford
 Bert Leroy Stilwell (AMSC); Larned
 Carl Henry Stirtz (TOSC); Abilene
 Charles M. St. John (SA1); Caney
 Orlo Otis St. John (MSC); Leoti
 William Daniel Stoltzenberg (FSC);
 Holyrood
 Olin Franklin Storer (AMSC); Studley
 Paul Franklin Stockard (TOSC); Abilene
 Jacob B. Stouffer (TOSC); Glen Elder
 Clyde E. Stout (FBVE); St. Joseph, Mo.
 Ada Florence Stowell (SASp); Vliets
 Ray Allen Stratford (AMSC); El Dorado
 Carl Herman Stromer (FBVE);
 Garner, Iowa
 Jacob Strunk (FBVE); Dillon
 Donald John Stuart (SASp); Manhattan
 Roy Stufflebeam (FBVE); Fort Scott
 Alfred Lannon Sturn (AMSC); Bushton
 Emma Stutz (SA3); Manhattan
 George Edward Stutz (SASp); Manhattan
 Albert Subera (TOSC); Caldwell
 Homer Lewis Sumner (SASp); Manhattan
 Rolla Summers (AMSC); Mont Ida
 Ruben Bernard Sundgren (SA1); Sitka
 George William Sutter (SASp);
 Kansas City, Mo.
 Albert Frederick Swan (AMSC); Topeka
 Robert Burns Swan (FBVE); Wayside
 Phillip Earl Swaney (TOSC); Belleville
 Joseph Frank Swarner (FBVE); Hartford
 Christopher Elmer Swart (AMSC); Riley
 Edna Anna Swart (HSC); Riley
 Albert William Swenson (FSC);
 Concordia
 Walter Garfield Swenson (AMSC); Lyons
 Paul James Swift (AMSC); Delavan
 Harry A. Swim (SASp); Manhattan
 Richard August Syring (AMSC); Alta Vista
 Joseph Benjamin Symms (SA1); Atchison
 Jesse Harper Tanner (TOSC); St. John
 John Thomas Tanner (AMSC); St. John
 George Rea Tarvin (FSC); Parsons
 Mary Elizabeth Tatkenhorst (HSC); Meade
 Melvin Beaumont Taylor (TOSC); Winfield
 Ray Teagarden (FSC); La Cygne
 Daniel Teare (FBVE); Farmington
 Fred Cass Teel (FBVE); Parsons
 Harry Hughes Teeter (AMSC); Oberlin
 Edmond Lee Thackrey (SA1); Simeon, Neb.
 Charley Admetus Thomas (FBVE);
 Cimarron
 Louise S. Thomas (HSC); Portis
 Lawrence Enos Thrush (BSC); Wakefield
 Robert Clifton Towery (FBVE); Grass
 Frank Raymond Townsend (FBVE);
 Madison
 Thomas Barker Tracy (SASp); Kansas City
 Frederick Leroy Travis (FBVE);
 Hornell, N. Y.
 Charles Homer Trego (FBVE); Humboldt
 Harold McKinley Trott (TOSC);
 Manchester
 Harold Junius Tucker (AMSC);
 Kansas City
 Royal Newton Umphres (FVE);
 Long Beach, Cal.

3. Auto Mechanics Short Course, first 8 weeks.
4. Tractor Operator Short Course, first 8 weeks.
5. Blacksmithing Short Course, first 8 weeks.

STUDENTS IN SPECIAL COURSES—concluded.

- Frances Mae Van Sickle (HSC); Green
 Eddie James Vermillion (FBVE);
 Coffeyville
 Olin Orson Vickers (FBVE); Topeka
 Kenneth Raymond Vilander (FSC);
 Manhattan
 Virginia Veronica Vilven (HSC); Wamego
 Mona May Vogelmann (SA1); Clay Center
 Clyde McFarland Voshell (SASp); Bucklin
 William Von Waaden (FSC); Hanover
 Charles Roy Wallace (FBVE); Washington
 Melvin Claycomb Wallace (SA2); Eureka
 Benjamin Guthrie Walters (SA1);
 Highland
 Fred John Walter (FSC); Lecompton
 John Erwin Walters (FSC); Earlton
 Ferne Argie Ward (SA2); Bancroft
 Leo Leroy Ward (FBVE); Kiowa
 Clarence Milford Warlan (ANSO);
 Lincolnville
 Joseph Leroy Warlen (AMSC);
 Lincolnville
 Lyle S. Warner (SASp); Iola
 Merle Burton Warner (FBVE); Burrton
 Guy Leslie Warren (TOSC); Wamego
 Roy Lee Waters (AMSC); St. Francis
 Harry Elmer Watkins (AMSC); Manhattan
 Carl Otto Watson (FBVE); Pittsburg
 Everett John Weeks (SASp); Belvue
 Helen E. Weeks (SASp); Belvue
 William Hargrave Weeks (SA1); Belvue
 Charles Monroe Wehry (MSC); Peabody
 Frank William Weickert (TOSC); La Cygne
 Charles Weir (FSC); Spring Hill
 Charles Lawrence Weir (AMSC); Oberlin
 Robert Harold Weir (TOSC); Winfield
 William Henry Weir (SA1); Topeka
 Pierre Weishaar (TOSC); Nortonville
 Richard Clinton Wells (SASp); Manhattan
 William Robert West (TOSC); Coats
 Earle Whitney Westgate (TOSC);
 Manhattan
 Julia Marian Westgate (SASp); Manhattan
 Lon Hurt Weyland (FBVE);
 Boonville, Mo.
 James M. Whitaker (FBVE); Topeka
 Charles Fletcher White (FBVE);
 Louisville, Ky.
 Charlie Lee White (SASp); Tulia, Tex.
 David Roundtree White (TOSC);
 Manhattan
 Lindon Victor White (TOSC); Manhattan
 Avis Wickham (SA3); Manhattan
 Fay Edith Wickham (SA1); Manhattan
 Harry Lloyal Wickstrum (AMSC); Green
 Horace Harry Wilkie (TOSC); Belleville
 John Camp Wilkins (SASp); Kansas City
 Cyrus Pierce Williams (SA1); Hunter
 Francis Reid Williams (SASp); Wakefield
 Lawrence Cooper Williams (FBVE);
 Goshen, Ind.
 Everett M. Wilson (ESC); Rozel
 Lee Alfred Wilson (FBVE); Milford
 William Wilson (TOSC); Manhattan
 Ray Byron Winfrey (FBVE);
 Independence, Mo.
 DeWitt Talmage Wintamute (FSC); Wright
 Fred William Winzler (TOSC); Lamont
 George Winzler (FSC); Hill Top
 Raymond John Wismer (SA1); Pomona
 Anna B. Withington (FSC); Lawrence
 Harry Lee Wobbe (FBVE); Uniontown
 Herbert O. Woellhof (AMSC); Broughton
 Charles F. Womses (FSC); Reading
 Chester Stanley Wood (SASp); Manhattan
 Joe Earl Wood (CCSC); Manhattan
 Lester Harold Wood (FSC); Dodge City
 Emma Gertrude Woolfolk (HSC); Topeka
 Clarence Johnson Worden (SA1);
 Woodston
 Garnett M. Work (AHSC); Ashton
 Walter Henry Wulfkuehle (FSC);
 Lecompton
 Wilber Judson Wylie (FSC);
 Doniphan, Mo.
 Roy Orville Yarrow (AMSC); Wakefield
 Irvin F. Yost (TOSC); Hesston
 Albert John Young (AMSC); Eskridge
 James Irvine Young (BSC); Wakefield
 John Albert Young (BSC); Wakefield
 Roberta Belle Young (SASp); Manhattan
 William Bernard Youngkamp (SA1);
 Manhattan
 Walter William Zabel (FSC); Onaga

3. Auto Mechanics Short Course, first 8 weeks.

4. Tractor Operator Short Course, first 8 weeks.

[illegible]

* One woman.
† Three women.

* One woman.

Students by States and Counties, 1919-1920

| | | | |
|---------------|-------|----------------|-------|
| Kansas | 3,088 | Minnesota | 1 |
| Arizona | 2 | Mississippi | 3 |
| Arkansas | 18 | Missouri | 85 |
| California | 3 | Montana | 1 |
| Colorado | 15 | Nebraska | 25 |
| Delaware | 1 | New Jersey | 1 |
| Florida | 2 | New York | 3 |
| Georgia | 1 | North Carolina | 1 |
| Idaho | 5 | Oklahoma | 32 |
| Illinois | 13 | Pennsylvania | 1 |
| Indiana | 3 | South Dakota | 2 |
| Kentucky | 2 | Texas | 19 |
| Iowa | 18 | West Virginia | 1 |
| Louisiana | 1 | Wyoming | 1 |
| Massachusetts | 4 | | |
| Michigan | 3 | Total | 3,354 |

FOREIGN COUNTRIES

| | | | |
|---------|---|--------------------|----|
| Armenia | 1 | Mexico | 1 |
| Brazil | 3 | Philippine Islands | 4 |
| Chili | 2 | Russia | 1 |
| China | 6 | South Africa | 1 |
| Finland | 1 | | |
| Greece | 1 | Total | 22 |
| Hawaii | 1 | | |

Grand total, 3,376

KANSAS COUNTIES

| | | | |
|-------------|----|--------------|------|
| Allen | 4 | Logan | 9 |
| Anderson | 39 | Lyon | 35 |
| Atchison | 18 | McPherson | 43 |
| Barber | 27 | Marion | 43 |
| Barton | 11 | Marshall | 37 |
| Bourbon | 28 | Meade | 7 |
| Brown | 39 | Miami | 27 |
| Butler | 40 | Mitchell | 22 |
| Chase | 10 | Montgomery | 19 |
| Chautauqua | 18 | Morris | 34 |
| Cherokee | 7 | Morton | 5 |
| Cheyenne | 8 | Nemaha | 24 |
| Clark | 18 | Neosho | 14 |
| Clay | 43 | Ness | 18 |
| Cloud | 34 | Norton | 16 |
| Coffey | 25 | Osage | 41 |
| Comanche | 21 | Osborne | 32 |
| Cowley | 62 | Ottawa | 33 |
| Crawford | 19 | Pawnee | 18 |
| Decatur | 7 | Phillips | 14 |
| Dickinson | 64 | Pottawatomie | 49 |
| Doniphan | 25 | Pratt | 21 |
| Douglas | 30 | Rawlins | 2 |
| Edwards | 18 | Reno | 46 |
| Elk | 15 | Republic | 28 |
| Ellis | 13 | Rice | 42 |
| Ellsworth | 7 | Riley | 727 |
| Finney | 14 | Rooks | 10 |
| Ford | 16 | Rush | 12 |
| Franklin | 42 | Russell | 18 |
| Geary | 25 | Saline | 40 |
| Gove | 8 | Scott | 5 |
| Graham | 2 | Sedgwick | 82 |
| Grant | 4 | Seward | 18 |
| Gray | 3 | Shawnee | 97 |
| Greenwood | 46 | Sheridan | 1 |
| Hamilton | 2 | Sherman | 1 |
| Harper | 35 | Smith | 1 |
| Harvey | 32 | Stafford | 2 |
| Haskell | 1 | Stevens | 3 |
| Hodgeman | 5 | Sumner | 1 |
| Jackson | 19 | Thomas | 1 |
| Jefferson | 30 | Trego | 4 |
| Jewell | 17 | Wabaunsee | 1 |
| Johnson | 21 | Wallace | 4 |
| Kearny | 1 | Washington | 1 |
| Kingman | 12 | Wichita | 1 |
| Kiowa | 3 | Wilson | 2 |
| Labette | 25 | Woodson | 6 |
| Lane | 3 | Wyandotte | 1 |
| Leavenworth | 43 | | |
| Lincoln | 17 | Total | 3,08 |
| Linn | 21 | | |

Record of Attendance, 1863-1919.

| College Year..... | Summer School..... | Housekeeper short course..... | Com'cial creamery short course..... | Dairy short course..... | Farmers' short course..... | Apprentice..... | Special..... | Preparatory..... | School of Agriculture..... | Freshman..... | Sophomore..... | Junior..... | Senior..... | Graduate..... | Counted twice..... | Total..... | Graduated..... | |
|-------------------|--------------------|-------------------------------|-------------------------------------|-------------------------|----------------------------|-----------------|--------------|------------------|----------------------------|---------------|----------------|-------------|-------------|---------------|--------------------|------------|----------------|-----|
| 1863-64 | | | | | | | | 93 | | 14 | | | | | | 107 | | |
| 1864-65 | | | | | | | | 90 | | 14 | 8 | 1 | | | | 113 | | |
| 1866-67 | | | | | | | | 154 | | 11 | 7 | 1 | 5 | | | 178 | 6 | |
| 1867-68 | | | | | | | | | | | | | | | | 168 | | |
| 1868-69 | | | | | | | | 146 | | 11 | 10 | 2 | | 1 | | 170 | | |
| 1870-71 | | | | | | | | 164 | | 13 | 7 | 5 | 5 | | | 194 | 5 | |
| 1871-72 | | | | | | | | 162 | | 22 | 10 | 3 | 2 | 3 | | 202 | 3 | |
| **1873 | | | | | | | | | | | | | | | | *217 | 2 | |
| 1873-74 | | | | | | | | 136 | | 24 | 14 | 3 | 6 | | | 183 | 5 | |
| 1874-75 | | | | | | | | 103 | | 26 | 10 | 2 | 2 | | | 143 | 2 | |
| 1875-76 | | | | | | | | | | | | | | | | 232 | 5 | |
| 1876-77 | | | | | | | | | | | | | | | | 234 | 9 | |
| 1877-78 | | | | | | | | 75 | | 42 | 23 | 5 | 5 | | | 150 | 4 | |
| 1878-79 | | | | | | | 1 | | | 89 | 89 | 16 | 12 | | | 207 | 9 | |
| 1879-80 | | | | | | | 1 | | | 166 | 61 | 35 | 11 | 2 | | 276 | 7 | |
| 1880-81 | | | | | | | 6 | | | 178 | 48 | 24 | 9 | 2 | | 267 | 8 | |
| 1881-82 | | | | | | | 5 | | | 227 | 50 | 19 | 11 | | | 312 | 9 | |
| 1882-83 | | | | | | | 4 | | | 241 | 60 | 30 | 12 | | | 347 | 12 | |
| 1883-84 | | | | | | | 2 | | | 255 | 92 | 26 | 18 | 2 | | 395 | 17 | |
| 1884-85 | | | | | | | 2 | | | 271 | 71 | 36 | 16 | 5 | | 401 | 14 | |
| 1885-86 | | | | | | | 1 | | | 273 | 91 | 35 | 24 | 4 | | 428 | 21 | |
| 1886-87 | | | | | | | | | | 303 | 100 | 44 | 24 | 10 | | 481 | 21 | |
| 1887-88 | | | | | | | | | | 305 | 92 | 46 | 27 | 2 | | 472 | 22 | |
| 1888-89 | | | | | | | | | | 266 | 103 | 41 | 28 | 7 | | 445 | 25 | |
| 1889-90 | | | | | | | 1 | | | 307 | 105 | 63 | 28 | 10 | | 514 | 27 | |
| 1890-91 | | | | | | | | | | 343 | 135 | 50 | 53 | 12 | | 593 | 52 | |
| 1891-92 | | | | | | | | | | 336 | 139 | 62 | 37 | 10 | | 584 | 35 | |
| 1892-93 | | | | | | | | | | 339 | 110 | 66 | 43 | 29 | | 587 | 39 | |
| 1893-94 | | | | | | | | | | 275 | 141 | 72 | 42 | 25 | | 555 | 39 | |
| 1894-95 | | | | | | | 5 | | | 276 | 108 | 89 | 64 | 30 | | 572 | 57 | |
| 1895-96 | | | | | | | 3 | | | 353 | 121 | 67 | 71 | 32 | | 647 | 66 | |
| 1896-97 | | | | | | | 6 | 67 | | 321 | 163 | 69 | 62 | 46 | | 734 | 55 | |
| 1897-98 | | | | 6 | | 9 | 15 | 77 | | 316 | 174 | 77 | 82 | 57 | 10 | 803 | 69 | |
| 1898-99 | | | | 26 | | 35 | 40 | 110 | | 306 | 177 | 92 | 65 | 40 | 21 | 870 | 53 | |
| 1899-00 | | 24 | | 57 | 47 | 50 | 32 | 162 | | 376 | 163 | 109 | 69 | 27 | 22 | 1094 | 58 | |
| 1900-01 | | 47 | | 72 | 109 | 79 | 23 | 318 | | 348 | 183 | 80 | 74 | 40 | 52 | 1321 | 60 | |
| 1901-02 | | 41 | | 66 | 125 | 87 | 19 | 298 | | 396 | 206 | 120 | 65 | 32 | 59 | 1396 | 52 | |
| 1902-03 | | 63 | | 38 | 123 | 78 | 36 | 342 | | 471 | 229 | 141 | 86 | 24 | 57 | 1574 | 55 | |
| 1903-04 | | 51 | | 16 | 122 | 72 | 33 | 443 | | 403 | 206 | 161 | 114 | 20 | 36 | 1605 | 102 | |
| 1904-05 | | 88 | | 24 | 99 | 12 | 30 | 500 | | 289 | 198 | 122 | 117 | 26 | 43 | 1462 | 107 | |
| 1905-06 | | 92 | | 28 | 118 | | 46 | 598 | | 373 | 214 | 145 | 110 | 30 | 64 | 1690 | 96 | |
| 1906-07 | | 134 | | 23 | 179 | | 48 | 144 | 511 | 411 | 269 | 149 | 133 | 24 | 88 | 1937 | 119 | |
| 1907-08 | | 188 | | 26 | 173 | | 42 | 134 | 528 | 450 | 357 | 202 | 148 | 26 | 82 | 2192 | 116 | |
| 1908-09 | | 168 | | 18 | 197 | | 42 | 134 | 521 | 491 | 381 | 243 | 171 | 28 | 86 | 2308 | 139 | |
| 1909-10 | | 152 | 4 | 111 | 124 | | 87 | 89 | 453 | 456 | 417 | 286 | 170 | 26 | 70 | 2305 | 146 | |
| 1910-11 | 31 | 142 | 9 | 26 | 285 | | 94 | | 364 | 533 | 412 | 288 | 248 | 34 | 59 | 2407 | 204 | |
| 1911-12 | 94 | 160 | 14 | | 280 | | 85 | | 580 | 337 | 461 | 288 | 261 | 44 | 81 | 2523 | 230 | |
| 1912-13 | 282 | 175 | 11 | | 239 | | 129 | | 654 | 444 | 432 | 355 | 268 | 55 | 166 | 2928 | 232 | |
| 1913-14 | 370 | 149 | 12 | | 223 | | 112 | | | 516 | 431 | 324 | 327 | 64 | 159 | 3027 | 289 | |
| 1914-15 | 472 | 127 | 18 | | 199 | | 120 | | | 560 | 575 | 368 | 383 | 321 | 48 | 3089 | 229 | |
| 1915-16 | 536 | 85 | 17 | | 207 | | 175 | | | 484 | 605 | 454 | 305 | 401 | 76 | 219 | 3314 | 357 |
| 1916-17 | 586 | 103 | 14 | | 228 | | 191 | 171 | | 422 | 693 | 471 | 378 | 282 | 68 | 277 | 3340 | 210 |
| 1917-18 | 481 | 92 | | 8 | 119 | | 135 | 138 | | 231 | 483 | 349 | 294 | 239 | 36 | 190 | 2406 | 190 |
| 1918-19 | 519 | 25 | 5 | | 160 | | 400 | 199 | | 216 | 810 | 322 | 254 | 201 | 34 | 144 | 2991 | 171 |
| 1919-20 | 415 | 57 | 3 | 6 | 117 | 354 | 271 | | 224 | 894 | 401 | 300 | 269 | 43 | 167 | 3352 | | |

* Estimated.

** Calendar year.

College Enrollment, 1919-1920.

| THE DIVISIONS. | Men. | Women. | Total. |
|---|-------------|-------------|-------------|
| The Division of Agriculture | 638 | 2 | 640 |
| Graduate Students..... | 8 | | 8 |
| Seniors..... | 83 | 1 | 84 |
| Juniors..... | 79 | | 79 |
| Sophomores..... | 110 | | 110 |
| Freshmen..... | 168 | | 168 |
| Special Students..... | 71 | | 71 |
| Students in Farmers' Short Course..... | 116 | 1 | 117 |
| Students in Creamery Short Course..... | 3 | | 3 |
| The Division of Veterinary Medicine | 89 | | 89 |
| Graduate Students..... | 1 | | 1 |
| Seniors..... | 24 | | 24 |
| Juniors..... | 21 | | 21 |
| Sophomores..... | 9 | | 9 |
| Freshmen..... | 30 | | 30 |
| Special Students..... | 4 | | 4 |
| The Division of Engineering | 914 | 4 | 918 |
| Graduate Students..... | 2 | | 2 |
| Seniors..... | 29 | | 29 |
| Juniors..... | 61 | | 61 |
| Sophomores..... | 118 | | 118 |
| Freshmen..... | 317 | 3 | 320 |
| Special Students..... | 25 | 1 | 26 |
| Students in Short Course for Auto Mechanics..... | 185 | | 185 |
| Students in Tractor Operators' Short Course..... | 137 | | 137 |
| Students in other Engineering Short Courses..... | 40 | | 40 |
| The Division of Home Economics | | 574 | 574 |
| Graduate Students..... | | 5 | 5 |
| Seniors..... | | 89 | 89 |
| Juniors..... | | 85 | 85 |
| Sophomores..... | | 93 | 93 |
| Freshmen..... | | 216 | 216 |
| Special Students..... | | 23 | 23 |
| Students in Housekeepers' Short Course..... | | 57 | 57 |
| Students in Lunch-room Management Short Course..... | | 6 | 6 |
| The Division of General Science | 263 | 240 | 503 |
| Graduate Students..... | 14 | 14 | 28 |
| Seniors..... | 27 | 20 | 47 |
| Juniors..... | 21 | 30 | 51 |
| Sophomores..... | 38 | 32 | 70 |
| Freshmen..... | 107 | 53 | 160 |
| Special Students..... | 56 | 91 | 147 |
| The School of Agriculture (Secondary School) | 165 | 59 | 224 |
| Students in Agriculture..... | 36 | | 36 |
| Students in Mechanic Arts..... | 18 | | 18 |
| Students in Home Economics..... | | 22 | 22 |
| Special Students..... | 111 | 37 | 148 |
| Noncollegiate Special Students* | 180 | | 180 |
| The Summer School | 159 | 256 | 415 |
| Totals..... | 2418 | 1125 | 3543 |
| Counted twice..... | 87 | 80 | 167 |
| Net Totals (not including lists cited below) | 2331 | 1045 | 3376 |
| The Division of College Extension | | | 6703 |
| Students in Credit Courses..... | | | 285 |
| Students in Vocational Courses..... | | | 122 |
| Students in Reading Courses..... | | | 6296 |

* Under the auspices of the Federal Board for Vocational Education.

Home Study Service Students

(Instruction by Correspondence)

For the year January 1, 1919, to January 1, 1920, the new enrollments for credit courses numbered 285, and those for extension or vocational courses 122. These numbers do not include enrollments holding over from the previous year. During the same period there were sent out 1,296 free reading courses, about 60,000 Boys' and Girls' Club lessons, 5,000 lessons to stationary engineers, and 2,500 follow-up lessons.

In the following list of enrollments, those taking credit courses are indicated by (c), and those taking vocational courses by (e). Vocational enrollments from the penitentiary are not included in the list, though they are included in the above number.

Adams, Cecyle (c); Oil City
 Adams, Kathryn R. (c); Topeka
 Alvord, Rauffe C. (c); Porcupine, S. Dak.
 Anderson, Mary (c); Huron
 Anderson, J. C. (c); Bennington
 Archer, Mabel (c); Norcatat
 Archer, Wm. L. (c); Denismore
 Armstrong, Max (c); Manhattan
 Ayers, Charlotte (c); La Harpe
 Baker, B. C. (e); Ashland
 Bauersfeld, Mrs. C. A. (c); Yates Center
 Baumgartner, Thomas R. (c); Devol, Okla.
 Barnes, Elmer B. (e); Grigsby
 Belt, Dorothy (c); Lane
 Berger, Marjorie (c); Sylvan Grove
 Bertram, Mrs. Mae (e); St. Francis
 Best, Laura (c); Admire
 Biby, Ernestine (c); Topeka
 Bixby, John (c); Coffeyville
 Botkin, Mildred N. (e); Burden
 Bowen, Velma (c); Covert
 Bowers, D. N. (c); Alma
 Bowers, James (e); Lawrence
 Boyer, P. P. (c); Bartlesville, Okla.
 Boyle, Nelson (c); Manhattan
 Boyle, John P. (c); Stilwell
 Bradley, Grace (c); Wichita
 Bradshaw, Irwin (c); Bucklin
 Brady, Nell (c); Smith Center
 Bray, Marian C. (c); Turon
 Brooks, Edwin H. (c); Tescott
 Brooks, Wm. H. (c); Manhattan
 Broternack, Mrs. Wayne (e); Kirwin
 Brown, Flossie (e); Natoma
 Brown, Francis M. (c); St. Marys
 Bruce, Wesley G. (c); Clay Center
 Bullen, B. F. (e); Syracuse
 Buller, J. S. (c); Coldwater
 Bullimore, R. (e); Tonganoxie
 Burkdoll, Bessie (c); Lane
 Burton, S. E. (c); Kearney, Neb.
 Butler, Vida (c); Albert
 Callinder, James (c); Manhattan
 Campbell, Barbara (c); Mulvane
 Campbell, D. R. (e); Manhattan
 Carr, Frank (c); Manhattan
 Carey, Myrtle (c); Manhattan
 Carlile, Mabel (c); Turon
 Cates, Vera (c); Pawnee, Okla.
 Case, Buford (e); Salina
 Child, Paul (c); Le Roy
 Crithird, Virgil (c); Leon
 Cingan, Ella (c); Springfield, Mo.
 Dose, Delmer (c); Belleville
 Dawson, Mrs. R. H. (e); Manhattan
 Doe, Maude M. (c); McPherson
 Doffin, Thelma E. (c); Le Roy
 Coffman, Harold (c); Chase
 Collins, Maurine (c); Belleville
 Copple, Robert F. (c); Manhattan
 Corby, Mrs. Nadia D. (c); Manhattan
 Corbett, Edith V. (e); Leona
 Cottrell, Roger C. (c); Irving
 Couch, Alvan H. (e); Haviland
 Covert, Mary Ida (c); Crawfordville
 Cromer, Fred B. (c); Manhattan
 Crow, Blaine (c); Havensville
 Cullum, Mae (c); Garnett
 Da Roin, Alice Claire (c); White City
 Dalton, Ruth M. (c); Frankfort
 Davis, Alberta (c); Topeka
 Davis, L. E. (e); Salina
 Deist, Lulu E. (c); Harper
 Dick, David P. (e); Newton
 Dick, Herbert (e); Newton
 Dickerhoof, Margaret (c); Stafford
 Dow, Davida (c); Salina
 Drevits, P. A. (e); Smolan
 Dubbs, Minnie (e); Ransom
 Duncan, Maud (e); Edgerton
 Ellis, Maggie (c); Westmoreland
 Elliott, J. C. (c); Belleville
 England, Melvin (c); Manhattan
 Enlow, Chas. R. (c); Harper
 Estes, Maude (c); Kansas City, Mo.
 Fine, A. M. (c); Quenemo
 Findley, Paul L. (c); Kiowa
 Fitzgerald, Mary (c); Waterville
 Fitzgerald, R. McLellan (e);
 Mumford Court, Mo.
 Fleming, Irene E. (c); Emporia
 Flippo, Gladys (c); Abilene
 Flynn, Bertha (c); Humboldt
 Foltz, Geo. A. (c); Oswego
 Ford, Gladys (c); Seneca
 Foster, Ralph L. (c); Penniman, Va.
 Fraim, Mrs. Ross (e); Liberal
 Freeman, Eli O. (c); Manhattan
 Frey, John (c); Manhattan
 Frost, Earl W. (c); Blue Rapids
 Funston, C. Edgar (c); Deerfield
 Furneaux, Abbie (c); Manhattan
 Gardner, Deane (c); Louisburg
 Gardner, Fred A. (c); Louisburg
 Garinger, Florence (c); Manhattan
 Garrett, E. L. (c); Coldwater
 Garvin, Artis Marie (c); Lawrence
 Gates, Clara (c); Esbon
 Gearn, W. A. (e); Harrison, Okla.
 Gillette, Margaret (c); Junction City
 Gill, Mary (e); Lawrence
 Githens, Otto B. (c); Scandia
 Goodwin, Ruth (c); Lamar, Mo.
 Gordan, Leila M. (c); Holton

HOME STUDY SERVICE STUDENTS—*continued.*

- Gordon, M. Alice (c); Leonardville
 Graham, Chas. H. (c); Stuttgart
 Graham, Emmett (c); Manhattan
 Graham, Mary (c); Garden City
 Graves, Chester (c); Manhattan
 Gramse, Greeta (c); Endora
 Greer, Monte W. (e); Burlingame
 Guernier, John W. (c); Coffeyville
 Guifre, Rexford (c); Simpson
 Haegele, Emma C. (c); Harlan
 Hall, Gussie (c); White Cloud
 Hancock, Gaylord (c); Emporia
 Haukenberry, Ada (c); Manhattan
 Haukenberry, Everett (c); Manhattan
 Harding, Ruth (c); Marion
 Hargiss, M. T. (e); Pittsburg
 Harling, Roy (e); Kincaid
 Harter, Earl P. (e); Mankato
 Harwood, Maud L. (c); Silvan Grove, Mo.
 Harvey, Cora (e); Neal
 Heaton, Leslie (c); Rush Center
 Hedquist, E. N. (e); Assaria
 Heinze, Elizabeth (c); Holyrood
 Hemphill, Albert (c); Blair, Neb.
 Hering, Olive (c); Stafford
 Herren, Sherman (c); Manhattan
 Higgins, H. F. (e); Blaine
 Hill, Robert Albert (c); Derby
 Hitch, Mary (c); Guymon, Okla.
 Hagenbuck, Mary E. (c); Troy
 Holtscaw, Otis M. (c); Longton
 Honeywell, Alfred (c); Seneca
 Horlicker, W. R. (c); Colby
 Houghton, W. W. (c); Emporia
 Houser, H. O. (c); Wichita
 Howard, D. C. (c); Coldwater
 Howard, Frank W. (c); Oakley
 Howard, Frank L. (c); New York City
 Hull, Ira E. (e); Zenith
 Hull, Fred H. (c); Portis
 Hume, James (c); Humboldt
 Ikenberry, Mrs. Julia (c); Manhattan
 Isaacs, O. L. (e); Peabody
 Isaacson, Robert (c); Leavenworth
 Jackman, Mr. Joy E. (c); Independence
 Johnson, A. C. (e); Cawker City
 Johnson, Helen (c); Wichita
 Johnson, Leoti (c); Guymon, Okla.
 Johnston, Mary (c); Gardner
 Jones, E. A. (c); Munden
 Kahn, Helen C. (c); Dwight
 Kell, John L. (c); Hunter
 Kerr, Wm. C. (c); Manhattan
 Kirk, Jesse K. (e); Bazaar
 Kirkwood, Mildred (c); Marysville
 Kelmp, Harry A. (c); Leavenworth
 Klug, H. L. (c); Cedar Rapids, Iowa
 Knoy, Cecil (c); Dodge City
 Kosel, John (c); Bowman, N. Dak.
 Kramer, Jeffe (c); Spivey
 Lafferty, Mary Pearl (c); Ellsworth
 Lahr, Ernest L. (c); San Antonio, Tex.
 Lang, Ralph C. (e); Sylvia
 Larson, Merville (c); Vesper
 Lear, Caroline (c); Stafford
 Leith, Ione (c); Irving
 Leum, Lung Vied (c); Stanford Univ., Cal.
 Litchfield, Lois (c); Manhattan
 Lockhart, Karl (c); Humboldt
 Love, H. W. (e); Kenneth
 Lunt, C. O. (c); Pratt
 Lyons, E. S. (c); Lawrence
 Macauley, Amy (e); Topeka
 Magee, Alice (c); Manhattan
 Mall, Elva (e); Soldier
 Mallory, S. V. (e); Summerfield
 Mangelsdorf, Paul C. (c); Atchison
 Marby, Stanton (c); Camp Funston
 March, Elizabeth (e); Oaks, S. Dak.
 Martin, Helen (c); Harper
 Martin, Vola Ruth (c); Chandler, Okla.
 Marvin, C. A. (e); Branson
 Maupin, Forest (c); Derby
 May, Mattie (c); Manhattan
 McCall, Elizabeth (e); Leonardville
 McCampbell, Earl (e); Wakeeney
 McConnell, Edw. S. (c); Belvue
 McFarland, Eugene (e); Topeka
 McGehee, Inez (c); Belleville
 McGilliard, Paul (c); K. S. A. C.
 McKeeman, Mark (c); Manhattan
 McKittrick, F. M. (e); Wilson
 McMillan, Bessie (c); Home
 Meyer, Ralph (c); Junction City
 Means, Violet (e); Edgerton
 Meliza, Fern Elizabeth (e); La Harpe
 Meserve, A. L. (c); Ellis
 Meserve, Velma (c); Hays
 Middleton, Adda (c); Ada
 Miller, Carl (e); Winfield
 Miller, Cecil (e); Meade
 Miller, J. M. (c); Manhattan
 Miller, Mathilde E. (c); Kansas City, Kan.
 Mills, C. A. (e); Lansing
 Mitchell, E. W. (c); Lovewell
 Mogge, Frieda E. (c); Alma
 Mohlman, Haw K. (c); Manhattan
 Montgomery, Katherine (c);
 Cottonwood Falls
 Moore, W. A. (e); Gridley
 Moorman, Allan (c); Manhattan
 Morlan, F. B. (e); Courtland
 Morris, Chas. F. (c); Wichita
 Moser, Mrs. Mollie S. (c); Westphalia
 Moyer, M. O. (c); Savonburg
 Muir, Edith (c); Manhattan
 Mullen, Joseph (c); Broughton
 Myers, C. H. (c); Hutchinson
 Myers, Jesse B. (e); Camp Funston
 Maher, Wm. A. (e); Kansas City
 Neel, Ward S. (e); Greeley
 Neely, Tom (c); Abilene
 Neighbor, Charles Henry (c); Junction City
 Nelson, Harry H. (c); Wakarusa
 Nevins, Eulalia (c); Dodge City
 Nicholson, Bethel (c); Wellington
 Nieman, Helen (c); White Water
 Nuzum, Fred (c); White Cloud
 Oerke, Bess (c); Caldwell
 Olander, Rena (c); Little River
 Olson, Arnold (e); Clay Center
 Palmer, Blanche (e); Sterling, Colo.
 Palmer, William (c); Leon
 Perrill, L. T. (c); Asherville
 Peters, J. F. (c); Funston
 Pharr, T. R. (c); Manhattan
 Phillipenny, Roberta J. (c); Manhattan
 Porter, Mrs. Sybil (e); K. S. A. C.
 Potter, S. L. (c); Westmoreland
 Powell, Faye M. (e); Iola
 Price, Elva (c); Baileyville
 Prickett, Doris (c); Wamego
 Prizer, R. M. (c); Clyde
 Quigley, C. B. (c); Blaine
 Ragh, Roland (c); K. S. A. C.
 Railsback, Katherine (e); Langdon
 Ramsey, C. A. (c); Topeka
 Read, C. W. (c); Cottonwood Falls
 Rebstock, Phoebe (c); Newton
 Reed, Clifford C. (c); Junction City
 Reid, Mrs. Josephine (e); Great Bend
 Reuter, Mrs. Wm. (e);
 Parkersburg, W. Va.
 Reynolds, Hattie E. (c); Camp Grant, Ill.
 Rhine, F. A. (c); Cleburne
 Richmond, Cecil K. (c); Topeka
 Riggs, Grace (e); Independence, Mo.
 Roberts, Norman L. (c); Manhattan

HOME STUDY SERVICE STUDENTS—concluded.

- Robinson, Edith (c); Atwood
 Robinson, W. E. (c); Towanda
 Rommell, Lillian (c); Waterville
 Rust, John H. (c); Morrowville
 Sanderson, Agnes (c); Little River
 Sanderson, Gertrude (c); Little River
 Sandman, Abbie (c); Manhattan
 Saum, Loyal K. (c); Norton
 Savatzky, John (e); Buhler
 Schaal, Laurence (c); Manhattan
 Schoneweis, Carl H. (e); Clay Center
 Scott, W. W. (c); El Dorado
 Seute, Herman (e); Lowemont
 Shell, Gladys (e); Deerhead
 Short, Laura Mae (e); Topeka
 Simpson, Lenora (c); Kansas City, Mo.
 Sloop, Homer J. (c); Manhattan
 Smith, Clara M. (c); Mound City
 Smith, Edith (c); Little River
 Smith, Madge (c); Little River
 Smith, Mildred (c); Burlingame
 Smythe, Ruth (c); Junction City
 Snapp, J. C. (c); Manhattan
 Snider, Moose (c); Dodge City
 Spring, Clyde (c); Manhattan
 Stackhouse, G. L. (e); McClure, Ohio
 Stalder, Edw. J. (e); Long Island
 Starr, Esther May (c); Towanda
 Steely, Edna (c); Rulo, Neb.
 Stein, Mrs. Mollie S. (c); Centralia
 Sterling, Mildred (c); Clay Center
 Stevenson, Rev. (e); Council Grove
 Stewart, Lillian (c); Watson, Mo.
 Stewart, Velda (e); Morganville
 Stonge, Esther (c); Riley
 Strahl, Paul (e); Overland Park
 Strowig, Gertie Marie (c); Topeka
 Stuejford, Ivar Olson (c); Hays City
 Summers, H. L. (c); Manhattan
 Swimm, Harry (c); Severance
 Swingle, Chas. F. (c); Manhattan
 Tayer, Marie (e); Waldron
 Taylor, Edith M. (c); Concordia
 Taylor, Ruth (c); Tyro
 Terrell, Henrietta (e); Herington
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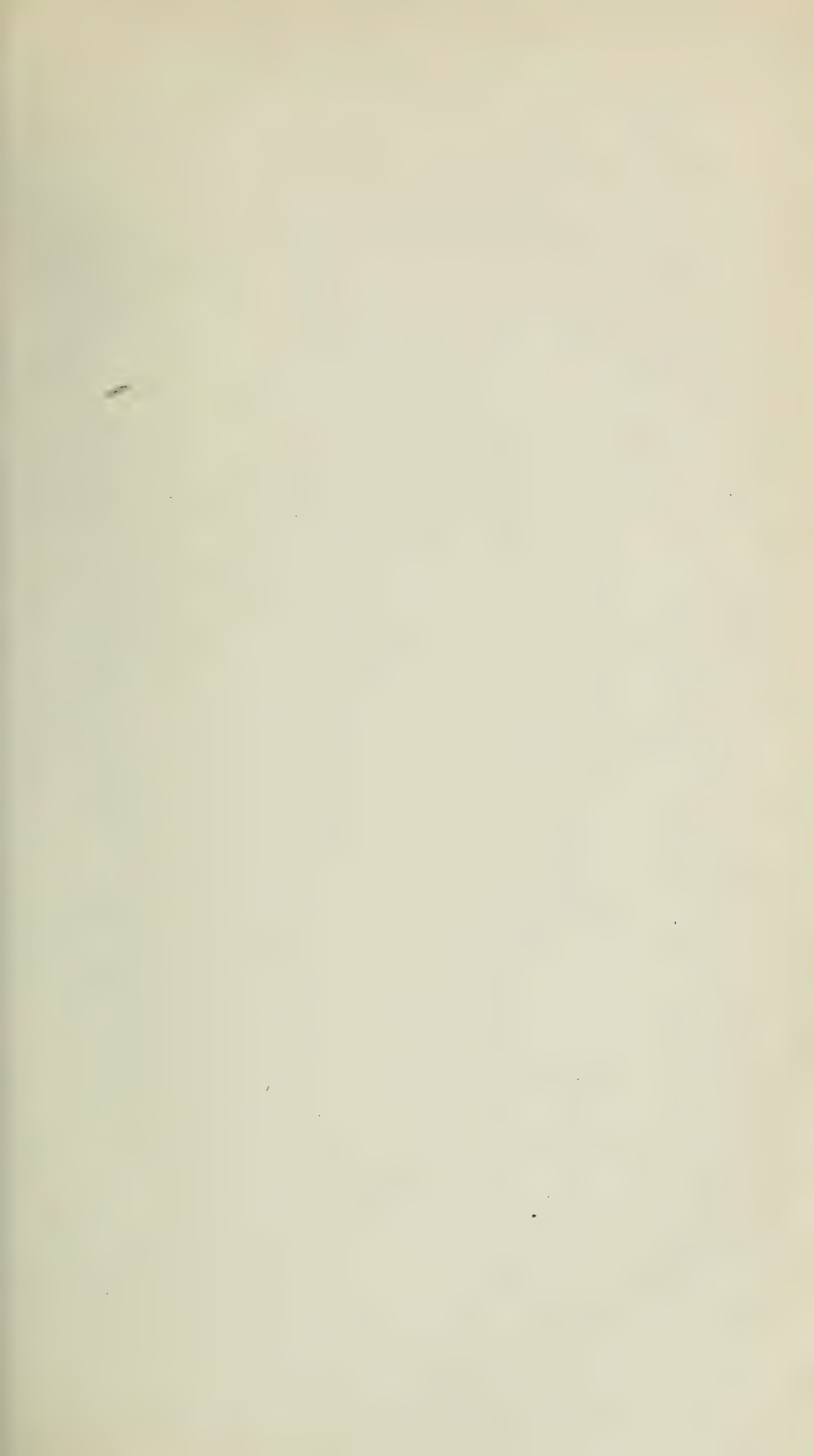
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1920/21

KANSAS STATE AGRICULTURAL COLLEGE BULLETIN

VOLUME V

MARCH 1, 1921

NUMBER 3

CATALOGUE

Fifty-eighth Session, 1920-'21

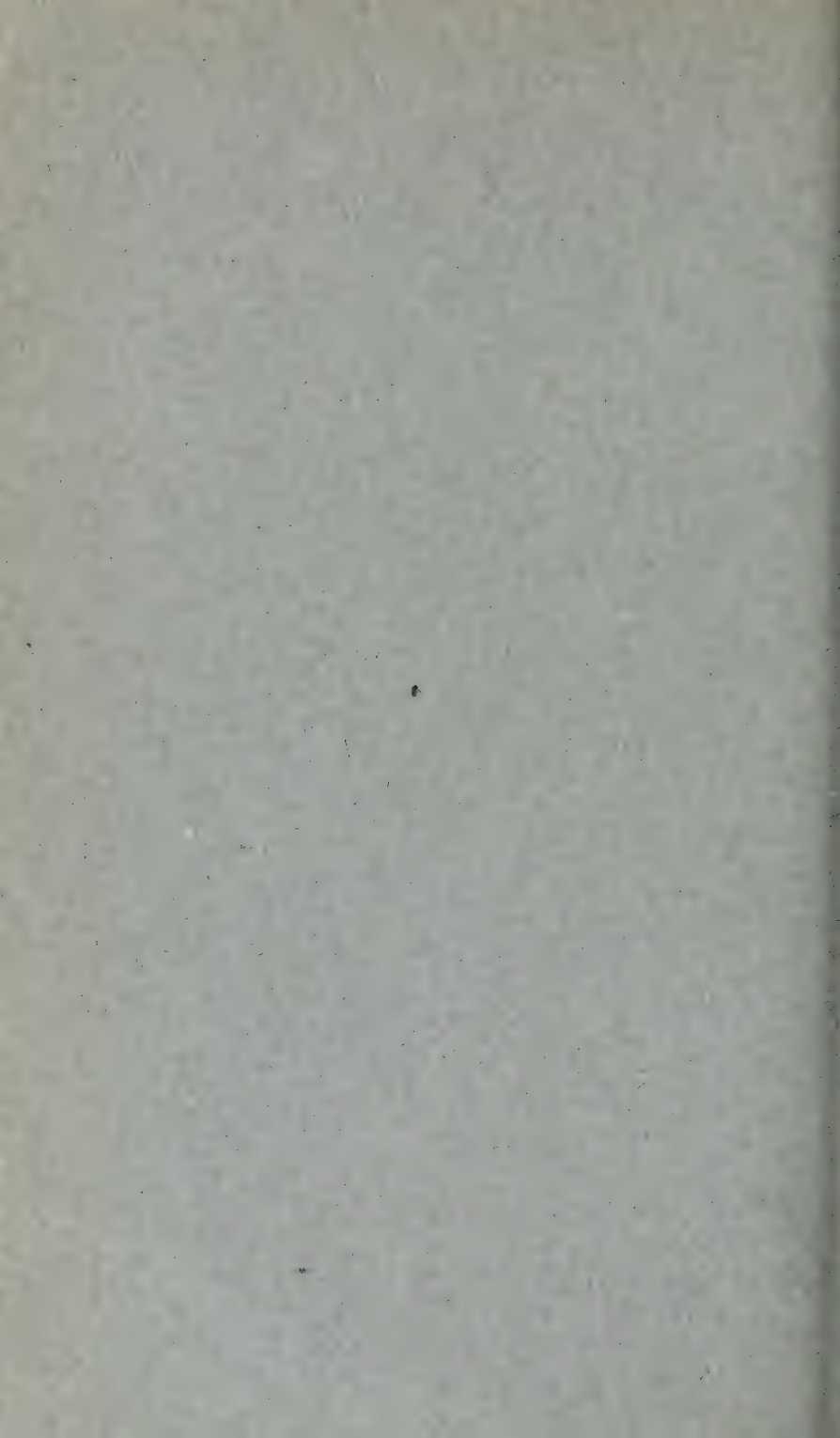
With ANNOUNCEMENTS for 1921-'22



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IMRI ZUMWALT, STATE PRINTER
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The Kansas State Agricultural College Bulletin is published on the first and fifteenth of each month by the Kansas State Agricultural College, Manhattan, Kan., to which requests for copies of the publication should be addressed. Entered as second-class matter November 6, 1916, at the post office at Manhattan, Kan., under the Act of August 24, 1912.

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CALENDAR

1921

| JANUARY | | | | | | | JULY | | | | | | |
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| MAY | | | | | | | NOVEMBER | | | | | | |
|-----|----|----|-----|-----|-----|-----|----------|----|----|----|-----|-----|-----|
| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ... | 1 | 2 | 3 | 4 | 5 | 6 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 29 | 30 | 31 | ... | ... | ... | ... | 27 | 28 | 29 | 30 | ... | ... | ... |

| JUNE | | | | | | | DECEMBER | | | | | | |
|------|-----|-----|----|----|-----|-----|----------|-----|-----|-----|----|----|----|
| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
| ... | ... | ... | 1 | 2 | 3 | 4 | ... | ... | ... | ... | 1 | 2 | 3 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 26 | 27 | 28 | 29 | 30 | ... | ... | 25 | 26 | 27 | 28 | 29 | 30 | 31 |

1922

| JANUARY | | | | | | | JULY | | | | | | |
|---------|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|
| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ... | ... | ... | ... | ... | ... | 1 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 29 | 30 | 31 | ... | ... | ... | ... | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| ... | ... | ... | ... | ... | ... | ... | 30 | 31 | ... | ... | ... | ... | ... |

| FEBRUARY | | | | | | | AUGUST | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|--------|-----|----|----|----|-----|-----|
| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
| ... | ... | ... | 1 | 2 | 3 | 4 | ... | ... | 1 | 2 | 3 | 4 | 5 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 26 | 27 | 28 | ... | ... | ... | ... | 27 | 28 | 29 | 30 | 31 | ... | ... |

| MARCH | | | | | | | SEPTEMBER | | | | | | |
|-------|-----|-----|----|----|----|-----|-----------|-----|-----|-----|-----|----|----|
| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
| ... | ... | ... | 1 | 2 | 3 | 4 | ... | ... | ... | ... | ... | 1 | 2 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 26 | 27 | 28 | 29 | 30 | 31 | ... | 24 | 25 | 26 | 27 | 28 | 29 | 30 |

| APRIL | | | | | | | OCTOBER | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|---------|-----|-----|-----|-----|-----|-----|
| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
| ... | ... | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | 1 | 2 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 | 29 | 30 | 31 | ... | ... | ... | ... |
| 30 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

| MAY | | | | | | | NOVEMBER | | | | | | |
|-----|----|----|----|-----|-----|-----|----------|-----|----|----|----|-----|-----|
| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
| ... | 1 | 2 | 3 | 4 | 5 | 6 | ... | ... | 1 | 2 | 3 | 4 | 5 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 28 | 29 | 30 | 31 | ... | ... | ... | 26 | 27 | 28 | 29 | 30 | ... | ... |

| JUNE | | | | | | | DECEMBER | | | | | | |
|------|-----|-----|-----|-----|-----|-----|----------|-----|-----|-----|-----|-----|-----|
| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
| ... | ... | ... | ... | 1 | 2 | 3 | ... | ... | ... | ... | ... | 1 | 2 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 25 | 26 | 27 | 28 | 29 | 30 | ... | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

The College Calendar

SUMMER SCHOOL, 1921

June 3, Friday.—Registration of students for Summer School begins at 8 a. m.
June 4, Saturday.—*All classes meet according to schedule.
June 4 to Aug. 5, Saturday to Friday.—Summer School in session, nine weeks.

FIRST SEMESTER, 1921-1922

Sept. 5, Monday.—†Special courses for auto-mechanics, tractor operators, machinists, blacksmiths, foundrymen, and carpenters begin.
Sept. 9, Friday.—All members of the instructional force on duty.
Sept. 10, Saturday.—Meeting of assigners with committee on schedule at 2 p. m.
Sept. 10, Saturday.—Meeting of assigners with deans at 3 p. m.
Sept. 12, Monday.—Admission and registration of students begin at 8 a. m.
Sept. 13, Tuesday.—Registration for Housekeepers' Course at 8 a. m.
Sept. 14, Wednesday.—Registration of students closes at 11 a. m.
Sept. 14, Wednesday.—Opening convocation, 11 a. m. to 12 m.
Sept. 14, Wednesday.—*All classes meet according to schedule, beginning at 1 p. m.
Oct. 8, Saturday.—Examinations to remove conditions.
Oct. 15, Saturday.—Scholarship deficiency reports due.
Nov. 12, Saturday.—Midsemester scholarship deficiency reports due.
Nov. 23, Wednesday.—Thanksgiving vacation begins at 12 m.
Nov. 26, Saturday.—Thanksgiving vacation closes at 6 p. m.
Dec. 21, Wednesday.—Housekeepers' Course closes at 12 m.
Dec. 21, Wednesday.—Winter vacation begins at 6 p. m.
Jan. 2, 1922, Monday.—†Special courses for auto-mechanics, electricians, tractor operators, machinists, blacksmiths, foundrymen, and carpenters begin.
Jan. 4, Wednesday.—Winter vacation closes at 6 p. m.
Jan. 9, Monday.—Short Course in Agriculture and Creamery Short Course begin.
Jan. 21 to 28, Saturday to Saturday.—Examinations at close of semester.
Jan. 28, Saturday.—First semester closes at 11 a. m.

SECOND SEMESTER, 1921-1922

Jan. 31, Tuesday.—Admission and registration of students begin at 8 a. m.
Jan. 31, Tuesday.—Registration for Housekeepers' Course begins at 8 a. m.
Feb. 1, Wednesday.—Registration of students closes at 11 a. m.
Feb. 1, Wednesday.—*All classes meet according to schedule, beginning at 1 p. m.
Feb. 6 to 11, Monday to Saturday.—Farm and Home Week.
Feb. 22, Wednesday.—Holiday, Washington's Birthday.
Feb. 25, Saturday.—Examinations to remove conditions.
Mar. 4, Saturday.—Scholarship deficiency reports due.
Mar. 4, Saturday.—Short Course in Agriculture and Creamery Short Course close at 12 m.
April 8, Saturday.—Midsemester scholarship deficiency reports due.
April 20, Thursday.—Announcement of elections of seniors to Phi Kappa Phi.
May 9, Tuesday.—Housekeepers' Course closes at 12 m.
May 19 to 25, Friday to Thursday.—Examinations for seniors.
May 25 to 31, Thursday to Wednesday—6 p. m.—Examinations at close of semester.
May 26, Friday.—Commencement Exercises, School of Agriculture.
May 30, Tuesday.—Holiday, Decoration Day.
June 1, Thursday.—Commencement Day.

SUMMER SCHOOL, 1922

June 2, Friday.—Registration of students for Summer School begins at 8 a. m.
June 3 to Aug. 4, Saturday to Friday.—Summer School in session, nine weeks.

FIRST SEMESTER, 1922-1923

Sept. 11, Monday.—Admission and registration of students begin at 8 a. m.
Sept. 13, Wednesday.—Registration of students closes at 11 a. m.

* Students must be present at the first meeting of each class or render a reasonable excuse. Failure to take out an assignment is not accepted as an excuse for absence from classes. A fee of one dollar is charged those who enroll after the time set for close of registration unless a reasonable excuse is offered.

† Similar courses begin the first Monday of every month from September to May, also at the beginning of the Summer School.

Standing Committees of the Faculty

ADMISSION: Jessie McD. Machir, J. V. Cortelyou, B. L. Remick, Ina Holroyd, J. O. Hamilton, W. H. Andrews, G. A. Dean, H. L. Ibsen, J. H. Robert.

ADVANCED CREDIT: *College.*—R. R. Price, L. E. Call, H. H. King, Elizabeth Rothermel, J. T. Willard, H. W. Davis.

School of Agriculture.—A. P. Davidson, E. V. James, W. T. Stratton, Wilma Orem.

ASSIGNMENT: Jessie McD. Machir, L. A. Fitz, W. H. Andrews, A. E. White, Araminta Holman, J. P. Calderwood.

ATHLETICS: Wm. M. Jardine, H. H. King, M. F. Ahearn, G. A. Dean, E. L. Holton, R. A. Seaton, R. I. Throckmorton, W. E. Muldoon, C. J. Stratton.

CATALOGUE: J. V. Cortelyou, J. T. Willard, H. W. Davis.

COLLEGE RULES: R. R. Price, J. T. Willard, J. E. Kammeyer.

DEBATE: J. E. Kammeyer, O. H. Burns, J. G. Emerson.

DISCIPLINE: Albert Dickens, L. A. Fitz, L. E. Conrad, J. W. Searson, Mary P. Van Zile.

FACULTY LOAN FUND: J. V. Cortelyou, Mary P. Van Zile, Helen B. Thompson, R. R. Dykstra, L. E. Call, R. A. Seaton, Jessie McD. Machir.

GRADUATE STUDY: W. A. Lippincott, L. E. Conrad, L. E. Call, Helen B. Thompson, H. H. King, R. K. Nabours, J. H. Burt.

PUBLIC EXERCISES: J. E. Kammeyer, J. V. Cortelyou, A. E. Westbrook, J. W. Searson, E. L. Holton, W. H. Andrews, W. A. Lippincott.

SCHEDULE OF CLASSES: A. E. White, J. T. Willard, W. T. Stratton, R. I. Throckmorton, L. E. Conrad, Hildegard Kneeland.

STUDENT AFFAIRS: Mary P. Van Zile, H. H. King, A. Dickens, J. G. Emerson, Edith L. Bond, E. V. James, F. B. Terrell.

STUDENT DIRECTORY: Jessie McD. Machir, E. T. Keith, J. T. Willard.

STUDENT HEALTH: L. E. Conrad, L. D. Bushnell, Mary P. Van Zile, C. M. Siever, M. F. Ahearn.

STUDENT HONORS: J. O. Hamilton, C. E. Reid, R. W. Conover.

VOCATIONAL GUIDANCE: F. D. Farrell, Mary P. Van Zile, Helen B. Thompson, J. T. Willard, R. A. Seaton, R. R. Dykstra, E. L. Holton.

Officers of Instruction and Administration

PRESIDENT

WILLIAM MARION JARDINE, B. S. A., LL. D., President of the College (1910, 1918).*

PROFESSORS

JOHN DANIEL WALTERS, M. S., A. D., Professor of Architecture, Emeritus (1876, 1917).

‡ M. S., 1883; A. D., 1908.

E 56; 809 N. Eleventh.

JULIUS TERRASS WILLARD, M. S., Sc. D., Vice President of the College (1883, 1918); Dean of Division of General Science (1883, 1909); Professor of Chemistry (1883, 1901); Consulting Chemist, Agricultural Experiment Station (1888, 1918).

B. S., 1883; M. S., 1886; Sc. D., 1908.

A 47; 431 Leavenworth.

BENJAMIN LUCE REMICK, Ph. M., Professor and Head of Department of Mathematics (1900).

Ph. B., Cornell College, 1889; Ph. M., *ibid.*, 1892.

A 71; 613 Houston.

ALBERT DICKENS, M. S., Professor and Head of Department of Horticulture (1899, 1902); Horticulturist, Agricultural Experiment Station (1899, 1902).

B. S., 1893; M. S., 1901.

H 30; 1230 Fremont.

RALPH RAY PRICE, A. M., Professor and Head of Department of History and Civics (1903).

A. B., Baker University, 1896; A. M., University of Kansas, 1898.

F 57; 826 Houston.

JULIUS ERNEST KAMMEYER, A. M., LL. D., Professor and Head of Department of Economics (1903, 1904).

A. B., Central Wesleyan College, 1886; A. M., *ibid.*, 1889; LL. D., Kansas City University, 1912.

A 52; 1010 Vattier.

JOHN VANZANDT CORTELYOU, Ph. D., Professor and Head of Department of Modern Languages (1904, 1916).

A. B., University of Nebraska, 1897; A. M., *ibid.*, 1901; Ph. D., University of Heidelberg, 1904.

N 59; 325 N. Fourteenth.

* One date standing after the title shows when the office was assumed. In the case of two dates separated by a comma or a semicolon, the first date indicates when services with the College began, the second when present office was assumed. Dates separated by a dash indicate times of assumption and termination, respectively, of the duties indicated in the title.

B. S. A., Utah Agricultural College, 1904; LL. D., Campbell College, 1916.

† A 30; 1020 Houston.

† The College buildings are designated by letters, as follows:

A—Anderson Hall (Administration).

K—Kedzie Hall (Cafeteria).

Ag—Waters Hall (Agriculture).

L—Home Economics Hall.

C—Denison Hall (Chemistry, Physics).

M—Auditorium.

CH—College Hospital.

MA—Music Annex.

D—Dairy Hall.

N—Nichols Gymnasium.

E—Engineering Hall.

R—Farm Machinery Hall.

F—Fairchild Hall (Library).

S—Engineering Shops.

G—School of Agriculture Hall.

V—Veterinary Hall.

H—Horticultural Hall.

W—Chemistry Annex.

I—Illustrations Hall.

X—Dairy Commissioner Building.

† In a statement of degrees without mention of the institution conferring them, the Kansas State Agricultural College is to be understood.

JOHN ORR HAMILTON, B. S., Professor and Head of Department of Physics (1901, 1908); Physicist, Engineering Experiment Station (1913).

B. S., University of Chicago, 1900.

C 57; 331 N. Fourteenth.

MARY PIERCE VAN ZILE, Dean of Women (1908, 1918).

Diploma, Iowa State College, 1904.

A 40; 800 Houston.

LOWELL EDWIN CONRAD, M. S., Professor and Head of Department of Civil Engineering (1908, 1909); Civil Engineer, Engineering Experiment Station (1913).

B. S., Cornell College, 1904; C. E., *ibid.*, 1906; M. S., Lehigh University, 1908.

E 32; 317 N. Seventeenth.

LESLIE ARTHUR FITZ, B. S., Professor and Head of Department of Milling Industry (1910, 1912).

B. S., 1902.

Ag 40; 1014 Houston.

EDWIN LEE HOLTON, A. B., Professor and Head of Department of Education (1910, 1913); Dean of the Summer School (1910, 1918).

A. B., Indiana University, 1904.

A 32; 217 N. Fourteenth.

ROY ANDREW SEATON, M. S., Dean of Division of Engineering (1904; Sept. 1, 1920); Director of the Engineering Experiment Station (1904; Sept. 1, 1920); Professor and Head of the Department of Applied Mechanics and Machine Design (1904, 1914).

B. S., 1904; M. S., 1910; S. B., Massachusetts Institute of Technology, 1911.

E 30; 722 Humboldt.

JAMES WILLIAM SEARSON⁹, A. M., Professor and Head of Department of English (1910, 1911).

A. B., University of Nebraska, 1896; A. M., *ibid.*, 1899.

K 27; 1314 Fremont.

ARTHUR BOURNE SMITH, Ph. B., B. L. S., College Librarian (1911).

Ph. B., Wesleyan University, 1900; B. L. S., University of Illinois, 1902.

F 32; 810 S. Juliette.

WILLIAM ADAMS LIPPINCOTT, Ph. D., Professor and Head of Department of Poultry Husbandry (1912); Poultry Husbandman, Agricultural Experiment Station (1912).

A. B., Illinois College, 1903; B. S., Iowa State College, 1911; M. S., University of Wisconsin, 1917; Ph. D., *ibid.*, 1920.

Ag 38; 321 N. Eighteenth.

LELAND DAVID BUSHNELL, M. S., Professor and Head of Department of Bacteriology (1909, 1912); Bacteriologist, Agricultural Experiment Station (1909; 1912).

B. S., Michigan Agricultural College, 1905; M. S., University of Kansas, 1915.

V 54; 801 Osage.

LELAND EVERETT CALL, M. S., Professor and Head of Department of Agronomy (1907; 1913); Agronomist, Agricultural Experiment Station (1907, 1913).

B. S. in Agr., Ohio State University, 1906; M. S., *ibid.*, 1912.

Ag 58; 223 N. Fourteenth.

GEORGE ADAM DEAN, M. S., Professor and Head of Department of Entomology (1902, 1913); Entomologist, Agricultural Experiment Station (1902, 1913).

B. S., 1895; M. S., 1905.

F 52; 325 N. Seventeenth.

ROBERT KIRKLAND NABOURS, Ph. D., Professor and Head of Department of Zoölogy (1910, 1913); Zoölogist, Agricultural Experiment Station (1910, 1913); Curator of the Natural History Museum (1910).

Ed. B., University of Chicago, 1905; Ph. D., *ibid.*, 1911.

F 54; 930 Laramie.

⁹ Resigned June 1, 1921.

RALPH RALPH DYKSTRA, D. V. M., Dean, Division of Veterinary Medicine (1911; 1919); Professor and Head of Department of Surgery (1911, 1913).

D. V. M., Iowa State College, 1905.

V. 29; 607 Houston.

CLARENCE ERLE REID, B. S., Professor and Head of Department of Electrical Engineering (1914); Electrical Engineer, Engineering Experiment Station (1914).

B. S. in E. E., Purdue University, 1902.

C 33; 421 N. Sixteenth.

FRANCES LANGDON BROWN,¹ A. B., B. S., State Leader of Home Demonstration Agents, Division of College Extension (1909, 1917 - Feb. 15, 1921).

B. S., 1909; A. B., Kansas State Normal School, 1913.

MICHAEL FRANCIS AHEARN, M. S., Professor and Head of Department of Physical Education, and Director of Athletics (1904; Sept. 16, 1920).

B. S., Massachusetts Agricultural College, 1904; M. S., 1913.

N 35; 110 N. Juliette.

NELSON ANTRIM CRAWFORD, A. M., Professor and Head of Department of Industrial Journalism and Printing (1910, 1915).

A. B., State University of Iowa, 1910; A. M., University of Kansas, 1914.

K 52; 221 N. Juliette.

ARTHUR EDGAR WESTBROOK,⁹ A. B., B. Mus., Director of Music and Professor of Voice (1915.)

A. B., Albion College, 1910; B. Mus., *ibid.*, 1911.

M 30; 309 N. Sixteenth.

CHARLES MOSES SIEVER, Ph. G., M. D., College Physician (1916).

Ph. G., Trinity University, 1903; M. D., *ibid.*, 1903; M. D., University of Kansas, 1907.

A 65; 1627 Anderson.

WALTER WILLIAM CARLSON, B. S., M. E., Professor and Head of Department of Shop Practice (1910, 1917); Superintendent of Shops (1910, 1912); Industrial Engineer, Engineering Experiment Station (1913).

B. S., 1908; M. E., 1916.

S 62; 1729 Laramie.

SAMUEL CECIL SALMON, B. S., Professor of Farm Crops (1913, 1917).

B. S., South Dakota Agricultural and Mechanical College, 1907.

Ag 82; 1648 Leavenworth.

JAMES GORDON EMERSON,¹⁰ J. D., Professor and Head of Department of Public Speaking (1915, 1917).

B. S., Iowa State College, 1912; J. D., Leland Stanford, Junior, School of Law, 1915.

G 56; 1623 Anderson.

CECIL FRANKLIN BAKER, M. S., Professor and Head of Department of Architecture (1917); Architect, Engineering Experiment Station (1917).

A. B., University of Illinois, 1907; B. S., Massachusetts Institute of Technology, 1907; M. S., *ibid.*, 1909.

E 57; Kenilcote, College Hill.

WALTER HORACE BURR, B. S., Professor of Sociology (1914; Jan. 1, 1921); Director of Rural Service, Division of College Extension (1914, 1915 - Jan. 1, 1921).

B. S., 1920.

A 3; 612 N. Fourteenth.

1. Resigned.

9. Resigned June 2, 1921.

10. Absent on leave, Feb. 15 to May 31, 1921.

HARRY JOHN CHARLES UMBERGER,² B. S., Dean, Division of College Extension (1911, 1919); Director of College Extension (1911, 1919).

B. S., 1905.

A 33; 1412 Leavenworth.

MARY WHITING MCFARLANE, M. S., Professor of Home Economics Extension, in Charge of Home Economics Specialists, Division of College Extension (1918; Feb. 15, 1921).

B. S., University of Wyoming, 1894; M. S., Oregon Agricultural College, 1916.

A 36; 1425 Laramie.

HERBERT HIRAM KING, Ph. D., Professor and Head of Department of Chemistry (1906, 1918); Chemist, Agricultural Experiment Station (1918); Chemist, Engineering Experiment Station (1909, 1918).

B. S., Ewing College, 1904; A. M., *ibid.*, 1906; M. S., 1915; Ph. D., University of Chicago, 1918.

C 30; 916 Humboldt.

CHARLES WILBUR MCCAMPBELL, D. V. M., Professor and Head of Department of Animal Husbandry (1910, 1918); Animal Husbandman, Agricultural Experiment Station (1910, 1918).

B. S., 1906; D. V. M., 1910; B. S. in Agr., 1918.

Ag 8; 343 N. Fourteenth.

RAY IAMS THROCKMORTON, B. S., Professor of Soils (1911, 1918).

B. S., Pennsylvania State College, 1911.

Ag 60; 825 Houston.

JAMES EDWARD ACKERT,⁴ Ph. D., Professor of Zoölogy (1913, 1918); Parasitologist, Agricultural Experiment Station (1913).

A. B., University of Illinois, 1909; A. M., *ibid.*, 1911; Ph. D., *ibid.*, 1913.

F 58; 1605 Humboldt.

ALFRED EVERETT WHITE, M. S., Professor of Mathematics (1909, 1918).

B. S., Purdue University, 1904; M. S., *ibid.*, 1909.

A 72; 1723 Fairchild.

JAMES BURGESS FITCH, B. S., Professor and Head of Department of Dairy Husbandry (1910, 1918); Dairy Husbandman, Agricultural Experiment Station (1910, 1918).

B. S., Purdue University, 1910.

D 30; 321 N. Sixteenth.

HALLAM WALKER DAVIS, A. M., Professor of English (1913, 1918).

A. B., Indiana University, 1909; A. M., Columbia University, 1913.

A 61; 520 N. Manhattan.

ARAMINTA HOLMAN, Professor and Head of Department of Applied Art (1913, 1918).

Graduate, New York School of Fine and Applied Art, 1912.

A 67; 1636 Fairchild.

FRANCIS DAVID FARRELL, B. S., Dean, Division of Agriculture (1918); Director, Agricultural Experiment Station (1918).

B. S., Utah Agricultural College, 1907.

Ag 34; 1515 Leavenworth.

HELEN BISHOP THOMPSON, Ph. D., Dean, Division of Home Economics (1918); Professor of Nutrition and Dietetics (1918).

B. S., 1903; M. S., 1907; A. M., Columbia University, 1913; Ph. D., Yale University, 1917.

L 30; 1212 Fremont.

VIVIAN LEWIS STRICKLAND, A. M., Professor of Education, in Charge of Home Study Service, Division of College Extension (1917; Feb. 15, 1921).

A. B., University of Nebraska, 1906; A. M., *ibid.*, 1915.

A 4; 1512 Leavenworth.

JAMES PARK CALDERWOOD, M. E., M. S., Professor of Mechanical Engineering (1918, 1919); Head of Department of Steam and Gas Engineering (1918; July 1, 1920); Mechanical Engineer, Engineering Experiment Station (1918).

M. E., Ohio State University, 1908; M. S., Pennsylvania State College, 1916.

S 55; 321 N. Fourteenth.

2. In coöperation with the U. S. Department of Agriculture.

4. Absent on leave, Feb. 1 to Sept. 1, 1921.

JAMES HENRY BURT, D. V. M., Professor and Head of Department of Anatomy and Physiology (1909, 1919).

V. S., Ontario Veterinary College, 1895; D. V. M., Ohio State University, 1905.
V 32; 800 Poyntz.

LEO EDWARD MELCHERS, M. S., Professor and Head of Department of Botany and Plant Physiology (1914, 1919); Plant Pathologist, Agricultural Experiment Station (1914).

B. S., Ohio State University, 1912; M. S., *ibid.*, 1913. H 58; 1801 Leavenworth.

EDWIN CYRUS MILLER, Ph. D., Professor of Plant Physiology (1910, 1919).

A. B., Lebanon College, 1906; A. B., Yale University, 1907; Ph. D., *ibid.*, 1910.
H 56; 501 Laramie.

LOTTA JEAN BOGERT, Ph. D., Professor and Head of Department of Food Economics and Nutrition (1919).

A. B., Cornell University, 1910; Ph. D., Yale University, 1916.
L 42; 1605 Leavenworth.

HILDEGARDE KNEELAND, A. B., Professor and Head of Department of Household Economics (1919).

A. B., Vassar College, 1911. L 42; 1212 Fremont.

FREDERICK BRAHAN TERRELL, Major Inf., U. S. A., Professor and Head of Department of Military Science and Tactics (1919); Commandant of Cadets (1919).

N 26; 830 Houston.

THOMAS JESSE TALBERT, A. M., Professor of Agricultural Extension, in Charge of Institutes and Extension Schools, Division of College Extension (1919; Feb. 15, 1921).

B. S. in Agr., University of Missouri, 1913; A. M., *ibid.*, 1917. A 34; 817 Osage.

CYRUS VANCE WILLIAMS, B. Ed., A. M., Professor of Vocational Education (May 15, 1920); State Director of Vocational Education (May 15, 1920).

B. Ed., (Peru) Nebraska State Normal School, 1909; A. M., University of Nebraska, 1910; B. S. in Agr., College of Agriculture, *ibid.*, 1919. I; 609 N. Ninth.

WILLIAM HIDDLESON ANDREWS,⁸ A. B., M. S., Professor of Education (1906; July 1, 1920).

A. B., University of Chicago, 1900; M. S., 1919. A 64; 630 Moro.

CHARLES OSCAR SWANSON,⁸ M. Agr., Professor of Agricultural Chemistry (1906; July 1, 1920); Associate Chemist, Agricultural Experiment Station (1906, 1914).

A. B., Carleton College, 1899; M. Agr., University of Minnesota, 1905.
C 6; 931 Bluemont.

IVOR VICTOR ILES, A. M., Professor of History and Civics (1911; July 1, 1920).

A. B., University of Kansas, 1905; A. M., *ibid.*, 1905. F 4; 1725 Fairchild.

JOSIAH SIMSON HUGHES, Ph. D., Professor of Chemistry (1910; July 1, 1920).

B. S., Ohio Wesleyan University, 1908; M. S., *ibid.*, 1910; A. M., Ohio State University, 1910; Ph. D., *ibid.*, 1917. C 41; 344 N. Fifteenth.

ROBERT WARREN CONOVER, A. M., Professor of English (1915; July 1, 1920).

A. B., Wesleyan University, 1911; A. M., *ibid.*, 1914. A 58; 1623 Anderson.

8. Absent on leave, 1921-'22.

JOHN CHRISTIAN PETERSON, Ph. D., Professor of Education (1917; July 1, 1920).

A. B., University of Utah, 1913; Ph. D., University of Chicago, 1917.
G 27; 1001 Thurston.

WILLIAM EDWARD MULDOON, D. V. M., A. M., Professor of Medicine (1919; July 1, 1920).

D. V. M., New York State Veterinary College, 1913; A. M., Cornell University, 1916.
V 33; 1709 Laramie.

FREDERICK ERVING COLBURN, Professor and Head of Department of Illustrations (1919; July 1, 1920).

I; 322 N. Seventeenth.

HERBERT FREDERICK LIENHARDT, D. V. M., Professor and Head of Department of Pathology (1917; July 1, 1920).

D. V. M., University of Pennsylvania, 1916. V 58; 1015 Fremont.

GEORGE ELLSWORTH RABURN, M. S., Professor of Physics (1910; Sept. 1, 1920).

A. B., University of Michigan, 1907; M. S., *ibid.*, 1916. C 61; 1014 Bluemont.

LOUISE PHILLIPS GLANTON, A. M., Professor and Head of Department of Clothing and Textiles (Sept. 1, 1920).

B. S., Columbia University, 1905; A. M., *ibid.*, 1917. L 56; 1220 Laramie.

ROBERT JOHN BARNETT, M. S., Professor of Horticulture (Oct. 10, 1920).

B. S., 1895; M. S., 1911. H 33; 1605 Humboldt.

HARRY BRUCE WALKER, B. S. in C. E., Professor of Engineering Extension, in Charge of Drainage, Irrigation, and Rural Engineering, Division of College Extension (1914; Feb. 15, 1921).

B. S. in C. E., Iowa State College, 1910. E 32; 110 S. Seventeenth.

KARL KNAUS,² B. S., Professor of Agricultural Extension, in Charge of County Agent Work, Division of College Extension (1916; Feb. 15, 1921); County Agent Leader, Division of College Extension (1916; July 1, 1920 - Feb. 15, 1921).

B. S., 1914. A 2; 519 N. Manhattan.

ASSOCIATE PROFESSORS

ODIS HERSCHEL BURNS, A. B., Associate Professor of English, and Debate Coach (1918, 1919).

A. B., University of Kansas, 1916. G 66; 1623 Anderson.

LEWIS CLARKE DAVIDSON, Major Inf., U. S. A., Associate Professor of Military Science and Tactics (1919).

Graduate, United States Military Academy, 1915. N 27; 630 Bluemont.

OLIVER WILLIAM HUNTER, M. S., Associate Professor of Bacteriology (1911, 1917).

B. S., 1909; M. S., University of Wisconsin, 1911. V 28; 417 Houston.

PORTER JOSEPH NEWMAN, M. S., Associate Professor of Chemistry (1909, 1918).

B. S., Franklin College, 1908; M. S., *ibid.*, 1910. W 27; 914 Leavenworth.

EDWARD GUERRANT KELLEY, M. S., Associate Professor of Entomology, Division of College Extension (1918; Feb. 15, 1921).

B. S., University of Kentucky, 1903; M. S., *ibid.*, 1904. F 76C; 804 Moro.

GRACE EMILY DERBY, A. B., Associate Librarian (1911, 1918).

A. B., Western College for Women, 1905. F 32; 1825 Leavenworth.

2. In coöperation with the U. S. Department of Agriculture.

- JAMES WALKER MCCOLLOCH, B. S.**, Associate Entomologist, Agricultural Experiment Station (1910, 1918).
B. S., 1912. F 76D; 1626 Leavenworth.
- HOWARD W. BRUBAKER, Ph. D.**, Associate Professor of Chemistry* (1913, 1918).
B. S., Carleton College, 1899; Ph. D., University of Pennsylvania, 1904.
C 64; 1116 Fremont.
- INA FOOTE COWLES, B. S.**, Associate Professor of Clothing and Textiles (1902, 1918).
B. S., 1901. L 55; 1200 Houston.
- MARY THERESA HARMAN, Ph. D.**, Associate Professor of Zoölogy (1912, 1918).
A. B., Indiana University, 1907; A. M., *ibid.*, 1909; Ph. D., *ibid.*, 1912.
F 76C; 1430 Poyntz.
- FLOYD WAYNE BELL, B. S. A.**, Associate Professor of Animal Husbandry (1918).
B. S. A., Cornell University, 1911. Ag 5; 906 Osage.
- EUSTACE VIVIAN FLOYD, B. S.**, Associate Professor of Physics (1911, 1918).
B. S., Earlham College, 1903. C 57; 1451 Laramie.
- EVAN F. FERRIN,¹ B. S.**, Associate Professor of Animal Husbandry (1918 - Oct. 15, 1920).
B. S. in A. H., Iowa State College, 1911.
- WALDO ERNEST GRIMES,⁸ B. S.**, Associate Professor of Agricultural Economics (1913, 1919); in Charge (1920).
B. S., 1913. Ag 51A; 1821 Leavenworth.
- ANDREW MINIE PATERSON, B. S.**, Associate Professor of Animal Husbandry (1913, 1919).
B. S., 1913. Ag 13; 1320 Fremont.
- JOHN HUNTINGTON PARKER, M. S.**, Associate Professor of Farm Crops (1917, 1919).
B. S. in Agr., University of Minnesota, 1913; M. S. in Agr., Cornell University, 1916.
Ag 76; 1809 Leavenworth.
- HAROLD MORTON JONES, B. S.**, State Dairy Commissioner (1913, 1919).
B. S., Purdue University, 1908. X; 904 Bluemont.
- CHARLES ELKINS ROGERS, A. B.**, Associate Professor of Industrial Journalism (1919).
A. B., University of Oklahoma, 1914. K 55; 532 N. Fourteenth.
- RUDOLPH LOUIS HENSEL, B. S. F.**, Associate Professor of Pasture Management (1919).
B. S. F., Iowa State College, 1913. Ag 82; 1416 Humboldt.
- PERCY LEIGH GAINEY, A. M., M. S.**, Associate Professor of Bacteriology (1914, 1919); Soil Bacteriologist, Agricultural Experiment Station (1914).
B. Agr., North Carolina A. and M. College, 1908; M. S., *ibid.*, 1910; A. M., Washington University, 1911. V 26; 1019 Houston.
- WILLIAM TIMOTHY STRATTON, A. M.**, Associate Professor of Mathematics (1910, 1919).
A. B., Indiana University, 1906; A. M., *ibid.*, 1913. A 70; R. F. D. 1.

1. Resigned.

8. Absent on leave, 1921-'22.

ELDEN VALORIUS JAMES, A. M., Associate Professor of History and Civics (1912, 1919).

A. B., Marietta College, 1901; A. B., University of Michigan, 1905; A. M., Marietta College, 1908. F 1; 621 Humboldt.

ELIZABETH ROTHERMEL, A. M., Associate Professor of Food Economics and Nutrition (1918, 1919).

A. B., University of California, 1899; A. M., Columbia University, 1913. L 35; 529 Houston.

WALTER GILLING WARD, B. S., Associate Professor of Rural Engineering, Division of College Extension (April 1, 1920).

B. S. in Arch., 1912. E 32; 905 Laramie.

WILMER ESLA DAVIS, A. B., Associate Professor of Botany (1909; July 1, 1920).

Graduate, Ohio Normal University, 1894; A. B., University of Illinois, 1903. H 76; 1014 Vattier.

ADA RICE, M. S., Associate Professor of English (1899; July 1, 1920).

B. S., 1895; M. S., 1912. G 28; 917 Osage.

JOSEPH HENRY MERRILL, Ph. D., Associate Professor of Apiculture (1912; July 1, 1920); Assistant Entomologist, Agricultural Experiment Station (1912); State Apiarist (1915).

B. S., Dartmouth College, 1905; Ph. D., Massachusetts Agricultural College, 1914. F 52; 626 Moro.

FORREST FAYE FRAZIER, C. E., Associate Professor of Civil Engineering (1911; July 1, 1920).

C. E., Ohio State University, 1910. E 55; 1815 Leavenworth.

MALCOLM CAMERON SEWELL, M. S., Associate Professor of Soils (1914; July 1, 1920).

B. S., 1912; M. S., Ohio State University, 1914. Ag 56; 530 N. Fourteenth.

ROYCE GERALD KLOEFFLER, B. S., Associate Professor of Electrical Engineering (1916; July 1, 1920).

B. S. in E. E., University of Michigan, 1913. C 33; 1014 Vattier.

CLINTON ELLICOTT PEARCE, S. B., Associate Professor of Machine Design (1917; July 1, 1920).

A. B., Massachusetts Institute of Technology, 1913; S. B., *ibid.*, 1919. S 61; 615 N. Eleventh.

LEILA ELISABETH DUNTON, M. S., Associate Professor of Milling Industry (1912; July 1, 1920).

B. S., 1910; M. S., 1912. Ag 40; 315 N. Sixteenth.

WILLIAM HENRY SANDERS, M. E., Associate Professor of Farm Engineering (1914; July 1, 1920), in Charge (1919).

B. S., 1890; M. E., 1916. R. 27; 1208 Kearney.

HARRY WINFIELD CAVE, M. S., Associate Professor of Dairy Husbandry (1918; July 1, 1920).

B. S. A., Iowa State College, 1914; M. S., 1916. D 30; 1638 Osage.

EDGAR TALBERT KEITH, B. S., Associate Professor of Printing (1912; July 1, 1920).

B. S., 1912. K 3; 1421 Poyntz.

CHARLES WILLIAM COLVER, Ph. D., Associate Professor of Organic Chemistry (1919; July 1, 1920).

B. S., University of Idaho, 1909; M. S., *ibid.*, 1911; Ph. D., University of Illinois, 1919. C 64; 1635 Fairchild.

RALPH W. MORRISH, Associate Professor of Junior Extension, in Charge of Boys' and Girls' Club Work, Division of College Extension (July 15, 1920).

A 37; 1623 Anderson.

MARGARET MESSENGER EDWARDS, A. M., Associate Professor of Education (Sept. 1, 1920).

B. S., Montana University, 1912; A. M., Columbia University, 1920.

L 64; 900 Leavenworth.

ROY MONROE GREEN, B. S., Associate Professor of Agricultural Economics (Sept. 1, 1920).

B. S. in Agr., University of Missouri, 1914.

Ag 51A; 309 Osage.

CHARLES HENRY SCHOLER, B. S., Associate Professor of Applied Mechanics (Oct. 1, 1920); Engineer of Tests in the Roads Materials Laboratory (Oct. 1, 1920).

E 8A; 806 Bluemont.

HOWARD TEMPLETON HILL,⁵ J. D., Associate Professor of Public Speaking (Oct. 1, 1920; Jan. 1 - June 1, 1921); Assistant Professor of Public Speaking (Oct. 1 - Dec. 31, 1920).

B. S., Iowa State College, 1910; J. D., University of Chicago, 1917.

LOYAL FREDERICK PAYNE, B. S., Associate Professor of Poultry Husbandry (Feb. 1, 1921).

B. S., Oklahoma A. and M. College, 1912.

Ag 38A; 1604 Humboldt.

CARL G. ELLING,² B. S., Associate Professor of Animal Husbandry, Division of College Extension (1918; Feb. 15, 1921).

B. S., 1904.

A 33; R. F. D. 1.

ALONZO FRANKLIN TURNER,² B. S., Associate Professor of Agricultural Extension (1917; Feb. 15, 1921); Assistant County Agent Leader, Division of College Extension (1917, 1920).

B. S., 1905.

A 2; 810 Moro.

ASSISTANT PROFESSORS

EDGAR LEMUEL TAGUE, A. M., Assistant Professor of Chemistry (1914); Assistant in Protein Chemistry, Agricultural Experiment Station (1914).

A. B., University of Kansas, 1908; A. M., *ibid.*, 1909.

C 3; 618 N. Manhattan.

WALTER LEROY LATSHAW, B. S., Assistant Professor of Chemistry (1914, 1918).

B. S., Pennsylvania State College, 1912.

C 3; 917 Fremont.

JAMES WALTER ZAHNLEY, B. S., Assistant Professor of Farm Crops (1915, 1919).

B. S., 1909; B. S. in Agr., 1918.

Ag 82; 1131 Laramie.

PAUL PORTER BRAINARD, A. M., Assistant Professor of Education, Division of College Extension (1919, 1920).

B. L., Whitman College, 1909; A. M., Columbia University, 1913.

A 5; 1224 Thurston.

HARRY BURDETT WINCHESTER, M. S., Assistant Professor of Animal Husbandry (1919).

B. S., Iowa State College, 1916; M. S., *ibid.*, 1917.

Ag 13; 1221 Laramie.

FRANK ELMER FOX, B. S., Assistant Professor of Poultry Husbandry (1916, 1919).

B. S., Iowa State College, 1915.

Ag 38; 1604 Humboldt.

2. In coöperation with the U. S. Department of Agriculture.

5. Temporary appointment.

- FREDERICK LEE HISAW, A. M.**, Assistant Professor of Zoölogy (1919);
Mammalogist, Agricultural Experiment Station (1919).
A. B., University of Missouri, 1914; B. S., *ibid.*, 1915; A. M., *ibid.*, 1916.
F 54A; 1622 Osage.
- HEMAN LAURITZ IBSEN, Ph. D.**, Assistant Professor of Genetics (1919).
B. S., University of Wisconsin, 1912; M. S., *ibid.*, 1913; Ph. D., *ibid.*, 1916.
Ag 15A; 1623 Anderson.
- ARTHUR FREDERICK PEINE, A. M.**, Assistant Professor of History and
Civics (1913, 1919).
A. B., Illinois Wesleyan University, 1911; A. M., University of Illinois, 1913.
F 4; 1201a Moro.
- LOUIS HENRY LIMPER, A. M.**, Assistant Professor of Modern Languages
(1914, 1919).
A. B., Baldwin Wallace College, 1907; A. M., University of Wisconsin, 1914.
N 61; 1324 Laramie.
- STANLEY ALBERT SMITH,¹ B. S.**, Assistant Professor of Architecture
(1913, 1919 - Sept. 30, 1920).
B. S., 1913.
- FLORENCE MABELLE HEIZER, A. B.**, Assistant Professor of English (1918,
1919).
A. B., Bethany College, 1907; A. B., University of Kansas, 1910.
A 53; 703 Poyntz.
- MARTHA S. PITTMAN, A. M.**, Assistant Professor of Food Economics and
Nutrition (1919).
B. S., 1906; B. S., Columbia University, 1916; M. S., *ibid.*, 1918.
L 47; 112 S. Twelfth.
- WILLIAM RAYMOND BRACKETT, A. B.**, Assistant Professor of Physics
(1919).
A. B., University of Colorado, 1905.
C 38; 1824 Humboldt.
- EDWARD CHAPMAN CONVERSE, A. M.**, Assistant Professor of Physics
(1919).
A. B., University of Illinois, 1904; A. M., *ibid.*, 1909.
C 38; College Hill.
- FRANK CALEB GATES, Ph. D.**, Assistant Professor of Botany (1919).
A. B., University of Illinois, 1910; Ph.D., University of Michigan, 1912.
H 57; 1515 Humboldt.
- ELMER LAMONT RHOADES, B. S.**, Assistant Professor in Farm Manage-
ment, Division of College Extension (1919; Feb. 15, 1921).
B. S., University of Missouri, 1916.
A 2; 512 Houston.
- ALLAN PARK DAVIDSON, B. S.**, Assistant Professor of Education (1919)
Principal, School of Agriculture (1919; July 1, 1920).
B. S., 1914.
G 29; 1200 Bertrand.
- ROY WILLIAM KISER,² B. S.**, Assistant Professor of Animal Husbandry
Division of College Extension (1918; Feb. 15, 1921).
B. S., 1914.
A 34; 1635 Fairchild.
- GEORGE GEMMELL, B. S.**, Assistant Professor of Agronomy, Division of
College Extension (1918; Feb. 15, 1921).
B. S., Kansas Manual Training Normal School, 1917; B. S., 1920.
A 5; 411 N. Sixteenth.
- RALPH KENNEY,¹ B. S. A.**, Assistant Professor of Crops, Division of
College Extension (1914 - Oct. 1, 1920).
B. S. A., Ohio State University, 1912.

1. Resigned.

2. In coopération with the U. S. Department of Agriculture.

- THOMAS ARTHUR CASE, D. V. M., Extension Assistant Professor of Veterinary Medicine, Division of College Extension (1918; Feb. 15, 1921.)
D. V. M., 1912. V 24; 1324 Laramie.
- FLOYD PATTISON, B. S., Assistant Professor of Steam and Gas Engineering, Division of College Extension (1919; Feb. 15, 1921).
B. S., 1912. A 5; 805 Kearney.
- LOUIS COLEMAN WILLIAMS, B. S., Assistant Professor of Horticulture, Division of College Extension (1915; Feb. 15, 1921).
B. S., 1912. H 26; 1110 Vattier.
- ROGER CLETUS SMITH, Ph. D., Assistant Professor of Entomology (1920).
A. B., Miami University, 1911; A. M., Ohio State University, 1914; Ph. D., Cornell University, 1917. F 64; 1605 Leavenworth.
- FRANK ANDREW DAWLEY, B. S., Assistant Professor of Agricultural Extension (1917; Feb. 15, 1921); Assistant County Agent Leader, Division of College Extension (1917, 1920).
B. S., 1895. A 2; 303 N. Fourteenth.
- LEVI GEORGE WREATH,⁵ Assistant Professor of Animal Husbandry, Division of College Extension (Apr. 5, 1920 - Oct. 1, 1920).
- FRANCIS BURZLEY MILLIKEN,⁵ B. S., Assistant Professor of Entomology, Division of College Extension (May 24 - Sept. 24, 1920).
B. S., 1909.
- HILMER HENRY LAUDE, M. S., Assistant Professor of Agronomy (June 1, 1920).
B. S., 1911; M. S., Texas A. and M. College, 1918. Ag 60; 1006 Laramie.
- JAMES ALWARD VAN FLEET,⁶ Major Inf., U. S. A., Assistant Professor of Military Science and Tactics (June 19, 1920 - Feb. 6, 1921).
Graduate, United States Military Academy, 1915.
- DANIEL EMMETT LYNCH, Assistant Professor of Forging (1914; July 1, 1920); Foreman of Blacksmith Shop (1914).
S 38; 1729 Laramie.
- EDWARD C. JONES, B. M. E., Assistant Professor of Shop Practice (1916; July 1, 1920); Foreman of Machine Shop (1916).
B. M. E., Iowa State College, 1905. S 31; 1011 Kearney.
- MANFORD W. FURR, B. S., Assistant Professor of Civil Engineering (1917; July 1, 1920).
B. S. in C. E., Purdue University, 1913. E 55; 1412 Laramie.
- MARGARET RUSSEL, A. M., Assistant Professor of English (1917; July 1, 1920).
A. B., Washburn College, 1913; A. M., Columbia University, 1915. A 54; 1212 Fremont.
- ELSIE HARRIET SMITH, Assistant Professor of Music (1917; July 1, 1920).
Graduate, Certificate Course, Chicago Musical College, 1909. M 58; 1318 Fremont.
- ALBERT JOHN MACK, B. S., Assistant Professor of Steam and Gas Engineering (1917; July 1, 1920).
B. S., 1912. E 26; 1512 Poyntz.

5. Temporary appointment.

6. Transferred.

HERBERT HENLEY HAYMAKER, M. S., Assistant Professor of Botany (1917; July 1, 1920).

B. S., 1915; M. S., University of Wisconsin, 1916. H 54; 315 N. Sixteenth.

LEON VINCENT WHITE, C. E., Assistant Professor of Civil Engineering (1918; July 1, 1920).

B. S., 1903; C. E., 1918. E 55; 1733 Anderson.

CLIFF ERRETT AUBEL, M. S., Assistant Professor of Animal Husbandry (1919; July 1, 1920).

B. S., Pennsylvania State College, 1915; M. S. 1917. Ag 13; 1506 Poyntz.

JOSEPH PRESTWICH SCOTT, D. V. M., Assistant Professor of Pathology (1916; July 1, 1920).

B. S., Scientific Gymnasium, Lausanne, Switzerland, 1910; D. V. M., Ohio State University, 1914. V 2; 1605 Leavenworth.

EDITH LORRAINE BOND, A. B., Assistant Professor of Physical Education for Women (1917; July 1, 1920).

A. B., University of Wisconsin, 1917. N 3; 315 N. Eighteenth.

JULES HENRY ROBERT, B. S., Assistant Professor of Applied Mechanics (1916; July 1, 1920).

B. S., 1914. E 53; 1623 Anderson.

GABE ALFRED SELLERS, B. S., Assistant Professor of Shop Practice (1919; July 1, 1920).

B. S., 1917. S 62; 1729 Laramie.

WILLIAM MAX MCLEOD, D. V. M., Assistant Professor of Anatomy (1919; July 1, 1920).

D. V. M., Iowa State College, 1917. V 32; 413 Houston.

EDWIN JACOB FRICK, D. V. M., Assistant Professor of Medicine (1919; July 1, 1920).

D. V. M., Cornell University, 1917. V 32; 1623 Anderson.

GEORGE ANDREW MAXEY, B. S., Assistant Professor of Dairy Husbandry (July 1, 1920).

B. S., University of Wisconsin, 1915. D 30; 1612 Osage.

CHARLES WILLIAM BACHMAN, LL. B., Assistant Professor of Physical Education and Head Coach of Athletics (Sept. 1, 1920).

LL. B., Notre Dame University, 1917. N 35; 1623 Anderson.

ELIZABETH HARGRAVE BALDWIN, B. S., Assistant Professor of Household Economics, and Director of Cafeteria (Sept. 1, 1920).

B. S., 1917. K 28; 606 Laramie.

CHARLES A. CHAPMAN, Major C. A. C., U. S. A., Assistant Professor of Military Science and Tactics (Sept. 1, 1920).

B. S., United States Military Academy, 1910. N 26; 301 Bluemont.

ALFRED LESTER CLAPP, B. S., Assistant Professor of Agricultural Extension; Assistant County Agent Leader, Division of College Extension (Sept. 1, 1920; Feb. 15, 1921).

B. S., 1914. A 2; 1215 Vattier.

MIRIAM ELLIOTT CLAY, A. B., Head of Circulation Department, College Library (Sept. 1, 1920).

A. B., Smith College, 1910. F 27; 1423 Fairchild.

ELIZABETH HAMILTON DAVIS, A. B., B. L. S., Reference Librarian (Sept. 1, 1920).

A. B., Illinois Women's College, 1909; B. L. S., University of Illinois, 1914. F 35; 421 N. Sixteenth.

LAWRENCE WILLIAM HARTEL, B. S., Assistant Professor of Physics (Sept. 1, 1920).

A. B., Central Wesleyan College, 1911; B. S., *ibid.*, 1912; B. S. in Ed., University of Missouri, 1915. C 61; 730 Osage.

ERVIN ARTHUR KNOTH, G. G., Assistant Professor of Physical Education (Sept. 1, 1920).

Graduate Gymnast, Normal College of American Gymnastic Union, 1917. N 35; 821 Poyntz.

AMY JANE LEAZENBY, A. M., Assistant Professor of Household Economics (Sept. 1, 1920).

B. S., University of Missouri, 1917; A. M., University of Chicago, 1920. L 41; 1409 Anderson.

CHARLES WALTON MATTHEWS, B. S., Assistant Professor of English (Sept. 1, 1920).

B. S., Kansas State Manual Training Normal School, 1918. A 66; 1623 Anderson.

IGNATIUS ALBERT WOJTASZAK, B. S., Assistant Professor of Applied Mechanics (Sept. 1, 1920).

B. S., University of Michigan, 1920. E 53; 1623 Anderson.

JESSE LAMAR BRENNEMAN, E. E., Assistant Professor of Electrical Engineering (Sept. 22, 1920).

B. S., University of Chicago, 1908; E. E., University of Wisconsin, 1913. C 33; R. F. D. 8.

GEORGE WILLIAM BROWER, First Lieut. U. S. A., Assistant Professor of Military Science and Tactics (Oct. 2, 1920).

D. V. M., Kansas City Veterinary College, 1913. V 27; 1207 Houston.

HUBERT ALOYSIUS MCNAMEE,⁵ Instructor in Traction Engines (Nov. 1, 1920 - Mar. 1, 1921).

Graduate, Air Service Mechanics School, 1918.

BERNARD MARTIN ANDERSON, B. S., Assistant Professor of Animal Husbandry (Dec. 1, 1920).

B. S., 1916. Ag 13; 323 Yuma.

EARLE REED DAWLEY, B. S., Assistant Professor of Applied Mechanics, and Assistant Engineer of Tests (Dec. 15, 1920).

B. S., University of Illinois, 1919. E 8; 1623 Anderson.

RUTH MARIE ELIZABETH HENNIG, B. S., Head Cataloguer, College Library (Jan. 1, 1921).

B. S., Simmons College, 1920. F 27; 730 Osage.

MINNIE SEQUIST, A. B., Assistant Professor of Clothing and Textiles, Division of College Extension (1916; Feb. 15, 1921).

A. B., Kansas State Normal School; Graduate, Stout Institute, 1916. A 36; 1020 Leavenworth.

SUSANNA SCHNEMAYER, B. S., Assistant Professor of Food Economics and Nutrition, Division of College Extension (1917; Feb. 15, 1921).

B. S., 1909. A 36; 512 N. Ninth.

RENA AURELIA FAUBION,² B. S., Assistant Professor of Food Economics and Nutrition, Division of College Extension (1918; Feb. 15, 1921).

B. S., 1910. A 36; 1424 Fairchild.

GEORGE W. SALISBURY, B. S., Assistant Professor of Agricultural Extension; Assistant County Agent Leader, Division of College Extension (1919; Feb. 15, 1921).

B. S., University of Illinois, 1915. A 2; 1623 Anderson.

2. In coöperation with the U. S. Department of Agriculture.

5. Temporary appointment.

CAMPBELL NELSON JACKSON, Capt. Inf., U. S. A., Assistant Professor of Military Science and Tactics (Feb. 6, 1921).
N 27; 215 S. Fifth.

ASSOCIATES

HOWARD ROBERT DEROSE, A. B., Associate in Food Analysis (1919).
A. B., University of Colorado, 1918. CA 30; 805 Houston.

GEORGE VANDERVEEN,¹ B. S., Associate in Feeding-stuffs Analysis (1919; Feb. 21 - Oct. 1, 1920).
B. S., University of Chicago, 1919.

RUSSELL NEWTON LOOMIS, B. S. Phar., Associate in Feed-stuffs Analysis (Oct. 25, 1920).
Ph. C., University of Colorado, 1915; B. S. Phar., *ibid.*, 1917.
CA 30; 917 Fremont.

INSTRUCTORS

WILLIAM LEONARD HOUSE, Instructor in Woodwork; Retired (1909; July 1, 1920).
608 Moro.

EDWARD GRANT, Instructor in Molding (1913); Foreman of Foundry (1913).
S 42; 1733 Laramie.

INA EMMA HOLROYD, B. S., Instructor in Mathematics (1900, 1904).
B. S., 1897; B. S., Kansas State Normal School, 1916. G 28; 1001 Moro.

EMMA FLORA FECHT, Instructor in Clothing and Textiles (1913, 1914).
Graduate, Bradley Polytechnic Institute, 1912. L 55; 314 N. Eleventh.

JOHN THOMPSON PARKER, Instructor in Woodwork (1906, 1917).
S 26; College Heights.

WILMA OREM, A. M., Instructor in History and Civics (1917).
B. S., 1910; A. M., University of Michigan, 1916. G 28; 413 Denison.

KATHERINE KIMMEL, Instructor in Voice (1917).
Graduate, Battle Creek (Mich.) Conservatory of Music, 1913.
M 52; 535 N. Manhattan.

EDWARD STAUNTON WEST, M. S., Instructor in Chemistry (1917, 1918).
A. B., Randolph Macon College, 1917; M. S., 1920. C 64; 617 N. Manhattan.

STELLA MAUDE HARRISS, M. S., Instructor in Chemistry (1917, 1918).
B. S., 1917; Graduate, (Peru) Nebraska State Normal School, 1908; M. S., 1919.
W 26; 804 Moro.

NORA ELIZABETH DALBEY, A. M., Instructor in Botany (1918).
A. B., University of Kansas, 1913; A. M., *ibid.*, 1914. H 54; 350 N. Sixteenth.

ODESSA DELLA DOW,⁷ B. S., Instructor in Chemistry (1918).
B. S., 1906. C 64; R. F. D. 1.

ERNEST BAKER KEITH, B. S., Instructor in Chemistry (1918).
B. S., 1913. W 26; 1031 Humboldt.

IZIL ISABEL POLSON, B. S., Instructor in Industrial Journalism (1918).
B. S., 1916. K 59; 1111 Bluemont.

BESS JANE MCKITTRICK, A. B., Instructor in Mathematics (1918).
A. B., University of Kansas, 1912. G 28A; 1212 Fremont.

1. Resigned.

7. Absent on leave, year 1920-'21.

- ALICE LENORE BROWN, A. B.,** Instructor in Zoölogy (1918).
A. B., University of Kansas, 1916. F 61; 321 N. Fourteenth.
- KATHERINE MAXWELL BOWER, B. S.,** Instructor in English (1918; 1919).
B. S., 1915. A 54; 510 N. Ninth.
- HERBERT C. STROM,** Instructor in Automobiles (1918, 1919).
S 62; 1209 Poyntz.
- MARY MATTIE McDONALD, Ph. B.,** Instructor in Clothing and Textiles (1916, 1919).
Ph. B., University of Chicago, 1916; Graduate, Eastern Illinois State Normal School, 1910; Graduate, Bradley Polytechnic Institute, 1912. L 64; 1318 Fremont.
- AUBREY DEAKENS CONROW, B. S.,** Assistant Engineer of Tests, Materials of Construction Laboratory, Engineering Experiment Station (1919).
B. S., 1913. E 8; R. F. D. 1.
- W. PEARL MARTIN,** Instructor in Home Nursing, Division of College Extension (1919).
Graduate, Christ Hospital, Topeka. A 36; 1231 Clay St., Topeka.
- WILLIAM FRANCIS PICKETT, B. S.,** Instructor in Horticulture (1917, 1919).
B. S., 1917. H 30; 923 Laramie.
- FLOYD ALONZO SMUTZ, B. S.,** Instructor in Drawing (1918, 1919).
B. S. in Arch., 1914. S 61; 1623 Anderson.
- HARRY WORKMAN AIMAAN,** Instructor in Carpentry (1918, 1919).
S 26; 728 Poyntz.
- FRED ROBERT BEAUDETTE, D. V. M.,** Instructor in Bacteriology (1919).
D. V. M., 1919. V 53; 1025 Bluemont.
- S. FRED PRINCE,** Biological Artist (1918, 1919).
I; 925 Thurston.
- NINA BESS CURRY,⁹** Instructor in Voice (1919).
- BERENICE FULLER, B. S.,** Instructor in English (1919).
B. S., Washburn College, 1904. A 55; 1301 Poyntz.
- HELEN MABEL HANNEN,** Instructor in Violin (1919).
Graduate, Malek School of Music, Grand Rapids, Mich., 1917; Graduate, Department of Public School and Community Music, Northwestern University, 1919. M 53; 1441 Laramie.
- MABEL LOUISE LEFFLER, Mus. B.,** Instructor in Piano (1919).
Mus. B., Oberlin Conservatory of Music, 1910. M 55; 1635 Fairchild.
- ARNOLD LEONE LOVEJOY,⁹** Instructor in Voice (1919).
- WILBUR NIELSON SKOURUP, B. S.,** Instructor in Chemistry (1919).
B. S., 1915; A. B., University of Kansas, 1916. CA 31; 805 Houston.
- MARY FIDELIA TAYLOR, B. S.,** Instructor in Physics (1919).
B. S., 1919. C 36; 350 N. Sixteenth.
- HAROLD PARKER WHEELER,** Instructor in Orchestral and Band Instruments (1919); Band Leader (1919).
M 29; 520 N. Manhattan.
- ANDREW WINTER,** Instructor in Automobiles (1919).
E 52A; 1200 Bertrand.

9. Resigned June 2, 1921.

BRENTON CREAMER ZIMMERMAN,¹ M. S. Agr., Instructor in Animal Husbandry (1919 - Feb. 15, 1921).

B. S. in Agr., Ohio State University, 1917; M. S. Agr., University of Missouri, 1918.

MERRILL AUGUSTUS DURLAND, B. S., Instructor in Mechanical Drawing (1919).

B. S., 1918.

S 63; 1116 Bluemont.

MIRIAM RUSSELL SPICER, A. B., Instructor in Chemistry (1919).

A. B., University of Kansas, 1917.

CA 26; 335 N. Fifteenth.

NORTON LEWIS HARRIS, Instructor in Poultry Husbandry, Division of College Extension (1920; Feb. 15, 1921).

Ag 38A; 901 Kearney.

EUGENE SIDNEY LYONS, B. S., Instructor in Soils (1920).

B. S., 1920.

Ag 55; 1000 Laramie.

HELEN W. FORD, B. S., Instructor in Household Economics, Division of College Extension (1920).

B. S., Rhode Island State College, 1914.

A 5A; 1212 Fremont.

GEORGE R. GREAVES,⁵ B. S., Assistant State Club Leader, Division of College Extension (April 1 - Dec. 31, 1920).

B. S., Cornell College, 1903.

CHARLES REESE GEARHART, B. S., Instructor in Dairy Husbandry, Division of College Extension (May 1, 1920).

B. S., University of Missouri, 1920.

D 31; 1623 Anderson.

JOHN MCGARRY, First Sergt. Inf., U. S. A., Instructor in Military Training (May 29, 1920).

N 26; 1609 Poyntz.

FRANK HAROLD GULICK, B. S., Instructor in Animal Husbandry, Division of College Extension (June 1, 1920).

B. S., 1920.

A 5; 1326 Fremont.

CLAUDE GUSTAVE HANSEN, B. S. in M. E., Instructor in Shop Practice (June 1, 1920).

B. S. in M. E., 1920.

S 31; 427 N. Sixteenth.

RALPH ALBERT ARMSTRONG, B. S. in M. E., Instructor in Shop Practice (June 11, 1920).

B. S. in M. E., 1909.

S 31; 609 N. Sixteenth.

ALENE HINN, B. S., Instructor in Junior Extension, Division of College Extension (June 17, 1920).

B. S., University of Wisconsin, 1918.

A 35; 1220 Leavenworth.

GRACE ROBERTA HESSE, A. B., Instructor in Modern Languages (1917; July 1, 1920).

A. B., University of Michigan, 1917.

N 61; 1318 Fremont.

CHARLES HOWARD KITSELMAN, D. V. M., Instructor in Pathology (1919; July 1, 1920).

D. V. M., University of Pennsylvania, 1918.

V 58; 1015 Fremont.

MARY ABBIE WORCESTER, B. S., Instructor in Clothing and Textiles (1919; July 1, 1920).

B. S., New Hampshire College, 1917.

L 65; 1318 Fremont.

1. Resigned.

5. Temporary appointment.

- STANLEY PAUL HUNT, B. S., Instructor in Applied Mechanics (July 1, 1920).
B. S., 1919. S 63; 522 Vattier.
- EFFIE ADAMS,⁵ B. S., Director of Cafeteria (July 1 - 31, 1920).
B. S., 1911.
- SIVERT ERICKSON, D. V. M., Instructor in Pathology (July 1, 1920).
D. V. M., 1920. V 55A; 1623 Anderson.
- RETA HAZEL DIELMANN, A. M., Instructor in History and Civics, Division of College Extension (July 15, 1920).
A. B., University of Kansas, 1917; A. M., *ibid.*, 1920. A 5; 337 N. Fourteenth.
- SIDNEY ALBERT WILSON, Sergt., U. S. A., Instructor in Military Training (July 23, 1920).
N 26; 716 Moro.
- LOUISE HELEN EVERHARDY, Instructor in Applied Art (1919; Sept. 1, 1920).
A 67B; 1110 Vattier.
- MORRIS EVANS, B. S., Instructor in Agricultural Economics (Jan. 1, 1920; Sept. 1, 1920).
B. S., in Agr., 1920. Ag 51A; 1601 Poyntz.
- MARY HANWAY BAKER,¹ A. B., Instructor in Violin (Sept. 1 - Dec. 21, 1920).
A. B., Martha Washington College, 1917.
- HUBERT BINGHAM BECKWITH, B. S. in E. E., Instructor in Electrical Engineering (Sept. 1, 1920).
B. S. in E. E., Georgia Institute of Technology, 1912. C 33; 815 Fremont.
- CHARLES JOHN BRADLEY, B. S. in M. E., Instructor in Mechanical Engineering (Sept. 1, 1920).
B. S. in M. E., Purdue University, 1920. E. 26; 812 Laramie.
- LEMMIE ROSCOE CLEVELAND, B. S., Instructor in Zoölogy (Sept. 1, 1920).
B. S., University of Mississippi, 1917. F 78; 1623 Anderson.
- HELEN MARTIN COLBURN, Instructor in Music (Sept. 1, 1920).
MA 2; 605 Leavenworth.
- WILLIAM TRUMAN CRANDALL, M. S., Instructor in Dairy Husbandry, Division of College Extension (Sept. 1, 1920).
B. S., Milton College, 1906; B. S. A., University of Wisconsin, 1909; M. S., *ibid.*, 1913. D 34; 1123 Houston.
- WALTER LEONARD DEHNER, B. S., Instructor in Architecture (Sept. 1, 1920).
B. S., University of Illinois, 1919. F 58; 1623 Anderson.
- RUDOLPH H. DRIFTMIER, B. S., Instructor in Farm Engineering (Sept. 1, 1920).
B. S. in A. E., Iowa State College, 1920. R 54; 931 Laramie.
- HELEN ELIZABETH ELCOCK, A. B., Instructor in English (Sept. 1, 1920).
A. B., College of Emporia, 1907. A 55; 1425 Laramie.

1. Resigned.

5. Temporary appointment.

- ANNABEL ALEXANDER GARVEY, A. M.,** Instructor in English (Sept. 1, 1920).
A. B., Wellesley College, 1912; A. M., University of Kansas, 1914.
A 57A; 1425 Laramie.
- FRED HEWITT FOX, B. S.,** Instructor in Civil Engineering (Sept. 1, 1920).
B. S. in G. Eng., Ohio State University, 1916. F 55; 1623 Anderson.
- KATHERINE HUDSON, B. S.,** Instructor in Food Economics and Nutrition (Sept. 1, 1920).
B. S., University of Wisconsin, 1918. L 34; 1641 Fairchild.
- IRENE MEYERS HUSE, B. S.,** Instructor in Zoölogy (Sept. 1, 1920).
B. S., New Hampshire College, 1918. F 62; 1318 Fremont.
- EMMA HYDE, A. M.,** Instructor in Mathematics (Sept. 1, 1920).
A. B., University of Kansas, 1912; A. M., University of Chicago, 1916.
G 28; 1423 Fairchild.
- FANNY MARGARET KELLER, Mus. G.,** Instructor in Piano (Sept. 1, 1920).
Mus. G., Northwestern University, 1920. MA 9; 1725 Fairchild.
- MILDRED LAUDER, A. B.,** Instructor in Household Economics (Sept. 1, 1920).
A. B., Wellesley College, 1918. L 36; 1015 Fremont.
- CLARENCE FLAVIUS LEWIS, A. B.,** Instructor in Mathematics (Sept. 1, 1920).
A. B., University of Denver, 1913. A 70; 412 Fremont.
- BOYD RILEY RINGO, Instructor in Piano (Sept. 1, 1920).**
Graduate, Cincinnati Conservatory of Music, 1918. MA 1; 1015 Vattier.
- ETHEL BEATRICE ROBINSON, B. S.,** Instructor in Music (Sept. 1, 1920).
B. S., Fort Hays Branch State Normal School, 1920. M 4; 900 Leavenworth.
- JAMES BOYLES ROGERS, A. M.,** Instructor in Zoölogy (Sept. 1, 1920).
A. B., University of Kansas, 1916; A. M., *ibid.*, 1917. F 62; 1623 Anderson.
- HELEN DOROTHY RUSHFELDT, A. M.,** Instructor in English (Sept. 1, 1920).
A. B., University of Minnesota, 1915; A. M., Columbia University, 1920.
G 28; 1220 Laramie.
- WINIFRED CATHERINE ST. JOHN, B. S.,** Assistant Reference Librarian (Sept. 1, 1920).
B. S., Simmons College, 1920. F 35; 930 Laramie.
- ANNA MARIE STURMER, A. M.,** Instructor in English (Sept. 1, 1920).
A. B., University of Nebraska, 1917; A. M., *ibid.*, 1920. A 53; 800 Osage.
- MILDRED RUTH TACKABERRY, M. S.,** Instructor in Food Economics and Nutrition (Sept. 1, 1920).
A. B., Morningside College, 1916; M. S., University of Chicago, 1921.
L 34; 1648 Fairchild.
- GLADYS ETHELWYNNE WARREN, Mus. B.,** Instructor in Piano (Sept. 1, 1920).
Mus. B., Lake Erie College, 1919; Graduate, New England Conservatory of Music, 1918.
MA 6; 1725 Fairchild.
- ERNEST BLAINE WELLS, B. S. A.,** Instructor in Soils, Division of College Extension (Sept. 1, 1920).
B. S. A., West Virginia University, 1917. Ag 59; 109 N. Ninth.
- RAYMOND WILLIAMS,¹** Instructor in Voice (Sept. 1, 1920 - June 2, 1921).
Teachers' Certificate in Voice, University of Oklahoma, 1908; Graduate in Public School Music, *ibid.*, 1914. MA 12; 307 N. Sixteenth.

1. Resigned.

WILLIAM MCCLINTOCK, First Sergt., U. S. A., Instructor in Military Training (Sept. 8, 1920).

N 26; 400 Houston.

MARION COFFEE, First Sergt., U. S. A., Instructor in Military Training (Sept. 13, 1920).

N 26; 418 S. Fourth.

FRANK WEINBERG, Sergt., U. S. A., Instructor in Military Training (Sept. 13, 1920).

N 26; 418 S. Fourth.

DWIGHT A. CUMMINGS, A. B., Instructor in Physics (Sept. 26, 1920).

A. B., Colorado College, 1918.

C 38; 1323 Anderson.

HAROLD REED GUILBERT, B. S., Instructor in Agriculture (Sept. 27, 1920).

B. S., 1920.

G 29; 1606 Fairchild.

ESTHER BRUNER, B. S., Instructor in Chemistry (Oct. 1, 1920).

B. S., 1920.

W 26; 408 Moro.

ARTHUR LEE, B. S., Instructor in Architecture (Oct. 1, 1920).

B. S. (Architecture), University of Illinois, 1920.

E 58B; 1622 Osage.

EARL RAYMOND HARROUFF, B. S., Instructor in Chemistry (Oct. 4, 1920).

B. S., 1916.

W 26; 815 Poyntz.

JOSEPH GARDEN TEW, B. S., Instructor in Applied Mechanics and Machine Design (Oct. 25, 1920).

B. S., Rhode Island State College, 1917.

S 63; 412 N. Eighth.

ROBERT MCKINLEY GOODWIN, Instructor in Traction Engines (Nov. 1, 1920).

R 28; 724 Laramie.

HENRY JOSEPH BOWHAY, Instructor in Shop Practice (Nov. 15, 1920).

S 31; 1217 Kearney.

WILLIAM SHAFFRATH WIEDORN, B. S., Instructor in Landscape Gardening (Nov. 15, 1920).

B. S., Cornell University, 1919.

H 33; 1709 Laramie.

JOHN JASPER BAYLES, B. S., Instructor in Farm Crops, Division of College Extension (Jan. 1, 1921; Feb. 15, 1921); Superintendent, Colby Branch Agricultural Experiment Station (1918; Jan. 1, 1921).

B. S., 1915.

NEVELS PEARSON, B. S., Instructor in Junior Extension, Division of College Extension (Jan. 1, 1921; Feb. 15, 1921); Specialist in Boys' and Girls' Club Work, Division of College Extension (May 15 - June 30, 1920).

B. S., 1920.

1623 Anderson.

HARRY E. REED, B. S. A., Instructor in Animal Husbandry, Division of College Extension (Jan. 1, 1921).

B. S. A., University of Missouri, 1914.

Ag 5; 1709 Laramie.

JOSEPH NATHANIEL LUNDEEN,⁵ Instructor in Traction Engines (Jan. 1 - Mar. 1, 1921).

ROBERT GORDON, Instructor in Music (Feb. 1, 1921).

Diploma in Theory and Band Instruments, School of Music, University of Michigan, 1920.

M 4; 227 Houston.

5. Temporary appointment.

DAVID MACKINTOSH, B. S., Instructor in Animal Husbandry (Feb. 1, 1921).

B. S., University of Minnesota, 1920.

Ag 13M; 315 Denison.

HARRIET WRIGHT ALLARD, Instructor in Household Economics, Division of College Extension (1917; Feb. 15, 1921).

A 36; 805 Houston.

LUTHER EARL WILLOUGHBY, B. S., Instructor in Farm Crops, Division of College Extension (1917; Feb. 15, 1921).

B. S., 1912; B. S. in Agr., 1916.

Ag 1623 Anderson.

GRACE WAUGH BOWMAN,⁵ Instructor in Public Speaking (Feb. 15 - May 31, 1921).

Graduate, University of Kansas, 1910; Graduate, Leland Powers School of the Spoken Word, Boston, 1912.

ELLIS ADOLPH STOKDYK, B. S., Instructor in Plant Pathology, Division of College Extension (Feb. 15, 1921).

B. S., University of Wisconsin, 1920.

H 56; 1623 Anderson.

ASSISTANTS

JESSIE GULICK, Assistant Cataloguer in Library (1907, 1911).

F 27; 421 N. Sixteenth.

ALANSON LOLA HALLSTED, B. S., Assistant in Dry Farming, Fort Hays Branch Agricultural Experiment Station (1910).

B. S., 1903.

Hays, Kan.

ASHER EULESTA LANGWORTHY, Ph. C., Feeding-stuffs Inspector, Agricultural Experiment Station (1912).

Ph. C., University of Kansas, 1911.

Ag 26; 1709 Laramie.

ROBERT GETTY,² B. S. A., Assistant in Forage Crops, Fort Hays Branch Agricultural Experiment Station (1913).

B. S. A., University of Nebraska, 1913.

Hays, Kan.

WILLIAM PATRICK HAYES, M. S., Assistant in Entomology (1913, 1914).

B. S., 1913; M. S., 1918.

F 76C; 1725 Anderson.

OTIS EVERETT STRODTMAN,² D. V. S., Deputy Inspector and College Representative, Marshall County Cholera Eradication Project (1914).

D. V. S., Kansas City Veterinary College, 1911.

Marysville, Kan.

HUGH DURHAM, A. M., Assistant to the Dean, Division of Agriculture (1915); Assistant to the Director, Agricultural Experiment Station (1915, 1918).

Graduate, Kansas State Normal School, 1901; A. B., University of Kansas, 1909; A. M., *ibid.*, 1915.

Ag 30; 730 Osage.

MABEL GERTRUDE BAXTER, Class Reserves Assistant in Library (1916).

F 31; 1624 Fairchild.

LESTER HENRY DRAYER, Assistant in Heat and Power (1916).

E 3; 1201 Kearney.

ELISABETH PERRY HARLING, Seed Analyst (1912, 1917).

Ag 77; 914 N. Manhattan.

HENRY JAMES ALLEN, Assistant in Heat and Power (1914, 1917).

E 27; 330 Vattier.

2. In coöperation with the U. S. Department of Agriculture.

5. Temporary appointment.

- GEORGE HERBERT PHINNEY, Assistant in Agronomy (1917); Foreman of Agronomy Farm (1917).
Graduate, Topeka Business College, 1903. Agronomy Farm.
- CHESTER WILLIS OAKES, Miller, Department of Milling Industry (1918).
Ag 26C; 1031 Vattier.
- CYRUS EARL BUCHANAN, Assistant in Feed Control (1912, 1918).
Ag 26A; 521 Vattier.
- MABLE CALDWELL, B. S., Journalist, Division of College Extension (1918; Aug. 1, 1920).
B. S., Oklahoma A. and M. College, 1918. A 34; 410 Leavenworth.
- LOUISE SCHWENSEN, Secretary to the Dean, Division of Engineering (1915, 1918).
- CORA ALBERTA PITMAN, B. S., Assistant to the Registrar (1918).
B. S., 1916. A 29; 730 Yuma.
- RUTH EVALYN HURD WEST, B. S., Assistant in Zoölogy (1918).
B. S., Carthage College, 1918. F 55; 617 N. Manhattan.
- BRUCE BUNYAN SMITH, B. S., Assistant in Farm Engineering (1918).
R 26; 830 Laramie.
- NATHAN DANIEL HARWOOD, D. V. M., Assistant in Vaccine Laboratories (1918; 1919).
D. V. M., 1918. V 32; 340 N. Sixteenth.
- MARTHA LIVINGSTON DENNY,¹ A. M., Assistant in Zoölogy (1918 - Oct. 7, 1920); Assistant in Genetics, Agricultural Experiment Station (1918 - Oct. 7, 1920).
A. B., Indiana University, 1917; A. M., *ibid.*, 1919.
- FRANK MARION AIMAN, State Feeding-stuffs Inspector (1919).
Ag 26B; 528 Laramie.
- EDDIE GRANELL, Assistant in Shop Practice (1919).
S 38; 809 Vattier.
- CLARENCE ROY JACCARD, B. S., Nurseryman, Fort Hays Branch Agricultural Experiment Station (1919).
B. S. in Agr., 1914. Hays, Kan.
- ESTHER FAYMAN, Secretary to the President (1919).
A 30; 314 N. Eleventh.
- CLARA ELIZABETH HIGGINS, B. S., Research Assistant in Poultry Husbandry (1919).
B. S., 1919. Poultry Farm; 1423 Fairchild.
- ALICE MAUDE MELTON, B. S., Secretary to the Dean, Division of General Science (1900, 1919).
B. S., 1918. A 49; 804 Moro.
- JOHN VICTOR ROLANDER, Assistant in Heat and Power (1919).
E 27; 517 Kearney.
- EDWARD L. CLAEREN, Major, U. S. R., Secretary to the Commandant (1910, 1919).
N 27; 900 Pierre.
- MARY ELVA CROCKETT, Secretary to the Dean, Division of Home Economics (Sept. 1, 1919).
L 29; 1503 Fairchild.

1. Resigned.

BLANCH SHIRLEY FRENCH,¹ B. S., Research Assistant in Agricultural Economics (1919 - Oct. 1, 1920).
B. S., 1919.

RUTH KATHRYN TRAIL, B. S., Assistant in Food Economics and Nutrition (1919).
B. S., Connecticut College for Women, 1919. L 53; 1318 Fremont.

GRACE ELLEN UMBERGER, B. S., R. N., Assistant to the College Physician (1919).
B. S., 1905; R. N., Illinois Training School for Nurses, 1909. A 65; 1110 Vattier.

MARION JULIA WILLIAMS,¹ B. S., Assistant in Food Economics and Nutrition (1919 - Dec. 31, 1920).
B. S., Connecticut College for Women, 1919.

DOROTHY JOSEPHINE CASHEN, M. S., Assistant in Botany (1919).
B. S., Carthage College, 1917; M. S., 1920. H 57; 317 N. Seventeenth.

ALBERT HARRISON KERNS, Assistant to the Superintendent, Fort Hays Branch Agricultural Experiment Station (1919).
Hays, Kan.

JOHN WORLEY TATTERSHALL, Assistant in Heat and Power (1920).
E 26B; 912 Thurston.

FRANK CUMISKEY, First Sergt., U. S. A., Assistant in Physical Training (Mar. 16, 1920).
N 26; 1015 Pierre.

GLADYS PAYNE,⁵ Domestic Art Specialist, Division of College Extension (Mar. 20 - June 30, 1920).

OTIS JAY GOULD, Sr., Deputy Dairy Commissioner (Apr. 1, 1920).
X 26; 900 Bluemont.

DELFA MARY HAZELTINE, Secretary to the Dean, Division of College Extension (May 1, 1920).
Graduate, Lawrence Business College. A 33; 817 Poyntz.

WARD WILLARD FETROW, B. S., Research Assistant in Agricultural Economics (June 1, 1920).
B. S., 1920. Holton, Kan.

WALTER ROY HARDER,⁵ Field Assistant in Crops (June 1 - Aug. 1, 1920).

CHARLES OTIS JOHNSTON, B. S., Experimental Assistant in Botany, Agricultural Experiment Station (April 1, 1920).
B. S., 1918. H 56; 1105 Vattier.

IRA KAULL LANDON,⁵ Field Assistant in Soil Fertility (June 1 - Aug. 1, 1920).

RAYMOND BROWN BECKER, M. S., Assistant in Dairy Husbandry (July 1, 1920).
B. S., Iowa State College, 1916; M. S. in A. H., *ibid.*, 1920. D 30; 1623 Anderson.

PERTTU HANNES VIRTANEN,¹ B. S., Assistant in Horticulture, and Greenhouse Foreman (July 1 - Oct. 1, 1920).
B. S., 1920.

1. Resigned.

5. Temporary appointment.

- NEIL EDWIN DALE, B. S., Assistant in Coöperative Experiments (Aug. 1, 1920).
B. S., 1918. Ag 60; 816 Osage.
- PAUL CAMPBELL MCGILLIARD, B. S., Assistant in Dairy Husbandry (Aug. 1, 1920).
B. S., 1916. D 30; 901 Laramie.
- HENRY RAYMOND BAKER, B. S., Assistant Bacteriologist, Agricultural Experiment Station (Sept. 1, 1920).
B. S., Massachusetts Agricultural College, 1920. V 53B; 1123 Houston.
- FLORENCE EVANS, B. S., Assistant in Applied Art (Sept. 1, 1920).
B. S., 1917. A 68; 1220 Laramie.
- JESSIE BELLE EVANS, Assistant in Physical Education for Women (Sept. 1, 1920).
N 3; 816 Leavenworth.
- ETHEL HASSINGER, Assistant in Music (Sept. 1, 1920).
MA 3; 1208 Laramie.
- EVALENE VIRGINIA KRAMER, B. S., Assistant in Household Economics (Sept. 1, 1920).
B. S., 1919. K 28; 1111 Bluemont.
- MARY ELIZABETH POLSON, B. S., Assistant in Clothing and Textiles (Sept. 1, 1920).
B. S., 1916. L 65; 1111 Bluemont.
- CLARENCE OSBORN PRICE, Assistant to the President (Sept. 1, 1920).
A 32; 412 Moro.
- JAMES M. WHITAKER, Assistant in Farm Engineering (Sept. 1, 1920).
Bks. 2, Rm. 7; N. Manhattan.
- ELIZABETH REBECCA MACHIR,¹ General Assistant in Library (Sept. 8, 1920 - Mar. 31, 1921).
F 3; 1641 Fairchild.
- RALPH DALE NICHOLS, B. S., Research Assistant in Agricultural Economics (Oct. 1, 1920).
B. S., 1920. McPherson, Kan.
- LOUISE TAUSCHE, Assistant in Physical Education (Oct. 1, 1920).
Diploma, Sargent School for Physical Education, 1920. N 2; 919 Leavenworth.
- NELLIE ERMA BEHNKE, R. N., Nurse, Department of Student Health (Oct. 15, 1920).
Graduate Nurse, Lakeside Hospital, Cleveland, Ohio, 1911. A 65; CH.
- CAROLINE MAY PERKINS, A. B., Assistant in Genetics (Dec. 1, 1920).
A. B., New Hampshire College, 1919. Insectary; 1430 Poyntz.
- WALTER BUSWELL BALCH, B. S., Assistant in Horticulture, and Greenhouse Foreman (Feb. 1, 1920).
B. S., Cornell University, 1919. H 33; 532 N. Fourteenth.
- MAUD FINLEY,⁵ Assistant in Millinery, Division of College Extension (April - June 30, 1921).
- ROBERT HENRY LUSH,⁵ B. S., Assistant in Dairy Husbandry, Division of College Extension (April 1 - June 30, 1921).
B. S., 1921.

1. Resigned.

5. Temporary appointment.

FRED CLARK OLD,⁵ B. S., Assistant in Poultry Husbandry, Division of College Extension (April 1 - June 30, 1921).

B. S., University of Missouri, 1917.

HOMER HENNEY,² B. S., Research Assistant in Agricultural Economics (April 8, 1921).

B. S., 1921.

Cottonwood Falls.

SUPERINTENDENTS

HARRY LLEWELLYN KENT, M. S., Superintendent, Fort Hays Branch Agricultural Experiment Station (1911; May 15, 1920).

A. B., Kansas State Normal School, 1912; B. S., 1913; M. S., 1920. Hays, Kan.

JACOB LUND, M. S., Superintendent of Heat and Power (1893, 1901); Custodian of Buildings and Grounds (1893, 1917).

B. S., 1883; M. S., 1886.

E 26B; 1414 Fairchild.

HAROLD BAYLISS MUGGLESTONE, Superintendent of Poultry Farm (1918).

Poultry Farm.

CHARLES WESLEY HOBBS, D. V. S., Superintendent of Vaccine Laboratories (1913, 1919).

D. V. S., Western Veterinary College, 1901.

V 31; 303 N. Sixteenth.

GEORGE RICHARD PAULING, Superintendent of Building and Repair (1916, 1919).

S 34; 1017 Fremont.

FAY ARTHUR WAGNER, B. S., Superintendent, Garden City Branch Agricultural Experiment Station (1919).

B. S. in Agr., New Mexico Agricultural College, 1916.

Garden City, Kan.

G. E. LOWREY, Superintendent, Tribune Branch Agricultural Experiment Station (1920).

Tribune, Kan.

BENJAMIN FRANCIS BARNES, B. S., Superintendent, Colby Branch Agricultural Experiment Station (Jan. 1, 1921).

B. S., 1918.

Colby, Kan.

AGRICULTURAL AGENTS³

WILLIAM ARMFIELD BOYS, B. S., Sumner County Agricultural Agent, Division of College Extension (1912, 1918).

B. S., 1904.

Wellington, Kan.

EVEREST JOHN MACY, B. S., Sedgwick County Agricultural Agent, Division of College Extension (1913, 1918).

B. S., Earlham College, 1904.

Wichita, Kan.

VALENTINE MEACHAM EMMERT, B. S., McPherson County Agricultural Agent, Division of College Extension (1916).

B. S., 1901.

McPherson, Kan.

RAYMOND OLIVER SMITH, B. S., Douglas County Agricultural Agent, Division of College Extension (1916, 1920).

B. S. in Agr., University of Nebraska, 1915.

Lawrence, Kan.

2. In coöperation with the U. S. Department of Agriculture.

3. All agricultural agents are employed coöperatively by the College and the U. S. Department of Agriculture, and in case of county agents in coöperation with the county farm bureaus.

5. Temporary appointment.

- RALPH POWELL SCHNACKE**, B. S., Pawnee County Agricultural Agent, Division of College Extension (1916).
B. S., 1916. Larned, Kan.
- IRA NICHOLS CHAPMAN**, B. S., Leavenworth County Agricultural Agent, Division of College Extension (1916).
B. S., 1916. Leavenworth, Kan.
- RAYMOND WALTER SCHAFER**,¹ M. S., Washington County Agricultural Agent, Division of College Extension (1917 - Dec. 31, 1920).
B. S., 1914; M. S., University of Wisconsin, 1917. Washington, Kan.
- FLOYD JOE ROBBINS**, B. S., Franklin County Agricultural Agent, Division of College Extension (1917).
B. S., 1913. Ottawa, Kan.
- CHARLES D. THOMPSON**, B. S. D., Neosho County Agricultural Agent, Division of College Extension (1918).
B. S. D., Warrensburg (Mo.) State Normal School, 1895. Erie, Kan.
- EDWIN ISAAC MARIS**, B. S., Rawlins County Agricultural Agent, Division of College Extension (1918).
B. S., 1916. Atwood, Kan.
- AVERY CLEVELAND MALONEY**, B. S., Bourbon County Agricultural Agent, Division of College Extension (1918).
B. S., 1918. Fort Scott, Kan.
- EDWARD H. LEKER**, B. S. A., Jackson County Agricultural Agent, Division of College Extension (1918).
B. S. A., University of Missouri, 1917. Holton, Kan.
- HERBERT LYNNE HILDWEIN**, B. S., Kingman County Agricultural Agent, Division of College Extension (1917, 1918).
B. S., 1914. Kingman, Kan.
- HAYS MARION COLE**, Montgomery County Agricultural Agent, Division of College Extension (1918).
Independence, Kan.
- FRANK SUMNER TURNER**, B. S., Anderson County Agricultural Agent, Division of College Extension (1918).
B. S., 1917. Garnett, Kan.
- JOE MYRON GOODWIN**, Jefferson County Agricultural Agent, Division of College Extension (1919).
Valley Falls, Kan.
- FRANK OTTO BLECHA**, B. S., Shawnee County Agricultural Agent, Division of College Extension (1919).
B. S., 1918. Topeka, Kan.
- GAYLORD HANCOCK**,¹ Lyon County Agricultural Agent, Division of College Extension (1919 - Nov. 15, 1920).
Emporia, Kan.
- FRANK HAROLD DILLENBACK**, B. S., Doniphan County Agricultural Agent, Division of College Extension (1919).
B. S., 1916. Troy, Kan.
- EMMETT L. GARRETT**, B. S. A., Comanche County Agricultural Agent, Division of College Extension (1919).
B. S. A., Oklahoma A. and M. College, 1915. Coldwater, Kan.

1. Resigned.

HENRY JOSEPH ADAMS, B. S., Gray County Agricultural Agent, Division of College Extension (1917, 1918).

B. S., 1917.

Cimarron, Kan.

CHARLES ELMER CASSEL, B. S., Finney County Agricultural Agent, Division of College Extension (1912, 1917).

B. S., 1910.

Garden City, Kan.

HARRY SCOTT WILSON,¹ Johnson County Agricultural Agent, Division of College Extension (1917; 1919 - Jan. 8, 1921).

Olathe, Kan.

ALBERT BARNEY KIMBALL, B. S., Harvey County Agricultural Agent, Division of College Extension (1918; June 1, 1920).

B. S., 1889.

Newton, Kan.

ROBERT ELLIOTT CURTIS, B. S., Clay County Agricultural Agent, Division of College Extension (1919).

B. S., 1916.

Clay Center, Kan.

JAMES HENDRIX McADAMS, B. S., Coffey County Agricultural Agent, Division of College Extension (1919).

B. S., 1916.

Burlington, Kan.

WILLIAM LOUIS TAYLOR,¹ B. S. A., Morris County Agricultural Agent, Division of College Extension (1919 - Feb. 8, 1921).

B. S. A., University of Missouri, 1917.

Council Grove, Kan.

CARL VINCENT MALONEY, B. S., Meade County Agricultural Agent, Division of College Extension (1919).

B. S., 1919.

Meade, Kan.

ORVILLE THOMAS BONNETT, B. S., Marshall County Agricultural Agent, Division of College Extension (1919).

B. S., 1918.

Blue Rapids, Kan.

BENJAMIN FRANCIS BARNES,¹ B. S., Cherokee County Agricultural Agent, Division of College Extension (1920 - Dec. 21, 1920).

B. S., 1918.

Columbus, Kan.

HERMAN FREDERICK TAGGE, B. S., Atchison County Agricultural Agent, Division of College Extension (1920).

B. S., 1914.

Effingham, Kan.

WILLIAM HERBERT BROOKS, B. S., Miami County Agricultural Agent, Division of College Extension (1920).

B. S., 1920.

Paola, Kan.

JOHN ALBERT HENDRICKS, B. S. A., Chase County Agricultural Agent, Division of College Extension (1920).

B. S., Iowa State College, 1913.

Cottonwood Falls, Kan.

ERNEST LEE McINTOSH, B. S., Nemaha County Agricultural Agent, Division of College Extension (1920).

B. S., 1920.

Seneca, Kan.

HARRY CHARLES BAIRD, B. S., Ford County Agricultural Agent, Division of College Extension (1920).

B. S., 1914.

Dodge City, Kan.

CLARENCE OWEN GRANFIELD, B. S., Wilson County Agricultural Agent, Division of College Extension (1920).

B. S., 1917.

Fredonia, Kan.

1. Resigned.

- CHARLES A. BOYLE, Cloud County Agricultural Agent, Division of College Extension (Mar. 10, 1920).
Concordia, Kan.
- ARTHUR I. GILKISON, Cheyenne County Agricultural Agent, Division of College Extension (Mar. 15, 1920).
St. Francis, Kan.
- CARL CARLSON, A. B., Rush County Agricultural Agent, Division of College Extension (April 1, 1920).
A. B., Southwestern College, 1914. La Crosse, Kan.
- CARL LEWIS HOWARD, B. S., Ellis County Agricultural Agent, Division of College Extension (May 1, 1920).
B. S., 1920. Hays, Kan.
- VERNON SIMPSON CRIPPEN, B. S., Pratt County Agricultural Agent, Division of College Extension (June 1, 1920).
B. S., 1920. Pratt, Kan.
- FREDERICK JOHN PETERS, B. S., Greenwood County Agricultural Agent, Division of College Extension (June 1, 1920).
B. S., 1920. Eureka, Kan.
- FLOYD MEREDITH PICKRELL, B. S., Clark County Agricultural Agent, Division of College Extension (June 1, 1920).
B. S., 1919. Ashland, Kan.
- KYLE DAVID THOMPSON, B. S., Rooks County Agricultural Agent, Division of College Extension (June 1, 1920).
B. S., 1920. Stockton, Kan.
- HARBERD STEPHEN WISE, B. S., Osage County Agricultural Agent, Division of College Extension (June 1, 1920).
B. S., 1920. Lyndon, Kan.
- THEODORE FRANKLIN YOST, B. S., Hodgeman County Agricultural Agent, Division of College Extension (June 1, 1920).
B. S., 1920. Jetmore, Kan.
- WARD RAY MILES, B. S., Barton County Agricultural Agent, Division of College Extension (June 3, 1920).
B. S., 1920. Great Bend, Kan.
- JOHN FREDERICK EGGERMAN, B. S., Wichita-Greeley County Agricultural Agent, Division of College Extension (July 1, 1920).
B. S., 1918. Leoti, Kan.
- CHARLES ARTHUR PATTERSON, B. S., Wyandotte County Agricultural Agent, Division of College Extension (July 10, 1920).
B. S., 1914. Kansas City, Kan.
- SAMUEL J. SMITH, B. S., Reno County Agricultural Agent, Division of College Extension (Aug. 10, 1920).
B. S., 1920. Hutchinson, Kan.
- WALTER WAYNE HOUGHTON, B. S., Jewell County Agricultural Agent, Division of College Extension (Sept. 1, 1920).
B. S., 1918. Mankato, Kan.
- ARTHUR LEROY MYERS, B. S., Marion County Agricultural Agent, Division of College Extension (Sept. 1, 1920).
B. S., 1920. Marion, Kan.
- RAYMOND FRANKLIN OLINGER, B. S., Labette County Agricultural Agent, Division of College Extension (Sept. 6, 1920).
B. S., 1913. Altamont, Kan.

JAMES ARTHUR MILHAM, B. S., Allen County Agricultural Agent, Division of College Extension (Oct. 11, 1920).
B. S., 1907. Iola, Kan.

CECIL LYMAN MCFADDEN, B. S., Lyon County Agricultural Agent, Division of College Extension (Nov. 20, 1920).
B. S., 1918. Emporia, Kan.

JOHN MONROE DODRILL, Ness County Agricultural Agent, Division of College Extension (Jan. 1, 1921).
Ness City, Kan.

ROY ELMER GWIN, B. S., Cherokee County Agricultural Agent, Division of College Extension (Jan. 1, 1921).
B. S., 1914. Columbus, Kan.

JOHN VERN HEPLER, B. S., Washington County Agricultural Agent, Division of College Extension (Jan. 3, 1921).
B. S., 1916. Washington, Kan.

PAUL BERNARD GWIN, B. S., Morris County Agricultural Agent, Division of College Extension (Feb. 1, 1921).
B. S., 1916. Council Grove, Kan.

CHESTER EUGENE GRAVES, B. S., Johnson County Agricultural Agent, Division of College Extension (Feb. 9, 1921).
B. S., 1920. Olathe, Kan.

CLELL ANSEL NEWELL, B. S., Assistant County Agricultural Agent, Neosho County, Division of College Extension (Feb. 16, 1921).
B. S., 1920. Erie, Kan.

HOME DEMONSTRATION AGENTS ²

ETHEL L. BREINER, Anderson County Home Demonstration Agent (Apr. 1, 1920), Division of College Extension.
Garnett, Kan.

SARA JANE PATTON, B. S., Cherokee County Home Demonstration Agent (1918, 1919), Division of College Extension.
B. S., 1915, K. S. A. C. Columbus, Kan.

MAUDE MILDRED COE,¹ B. S., McPherson County Home Demonstration Agent (1917; July 1, 1919 - December 31, 1920), Division of College Extension.
B. S., 1902, K. S. A. C. McPherson, Kan.

ETHEL McDONALD, B. S., Meade County Home Demonstration Agent (September 8, 1919), Division of College Extension.
B. S., 1907, K. S. A. C. Meade, Kan.

EDITH ANTONETTE HOLMBERG,¹ B. S., Morris County Home Demonstration Agent (1918; July 1, 1919 - Sept. 15, 1920), Division of College Extension.
B. S., 1908, K. S. A. C. Council Grove, Kan.

IRENE ALMA TAYLOR,¹ B. S., Shawnee County Home Demonstration Agent (1918; July 1, 1919 - Oct. 31, 1920), Division of College Extension.
B. S., 1908, K. S. A. C. Topeka, Kan.

JULIA WALCOTT KIENE, Shawnee County Home Demonstration Agent (Dec. 1, 1920), Division of College Extension.
Graduate, Stout Institute, Wisconsin. Topeka, Kan.

1. Resigned.

2. In coöperation with the U. S. Department of Agriculture.

FERN VIVIAN JESSUP, B. S., Nemaha County Home Demonstration Agent (April 1, 1920), Division of College Extension.
B. S., 1911, K. S. A. C. Seneca, Kan.

MOLLIE LINDSEY, Washington County Home Demonstration Agent (1918, 1919), Division of College Extension.
Washington, Kan.

COUNTY LEADERS IN BOYS' AND GIRLS' CLUB WORK

JESSIE STEVENS MCCAFFERTY, Jefferson County Club Leader, Division of College Extension (1918, 1919).
Oskaloosa, Kan.

LOLA BELLE THOMPSON,¹ A. B., Rice County Club Leader, Division of College Extension (1918, 1919 - Oct. 31, 1920).
A. B., College of Emporia, 1916. Lyons, Kan.

FLORENCE WHIPPLE, B. S., Leavenworth County Club Leader, Division of College Extension (1919).
B. S., 1912. Leavenworth, Kan.

MARY E. GRIFFITH, Brown County Club Leader, Division of College Extension (Apr. 1, 1920).

THELMA O'DELL, Coffee County Club Leader, Division of College Extension (Apr. 19, 1920).

GRADUATE ASSISTANTS

EMILY HARRIETT ANDERSON,¹¹ B. S., Graduate Assistant in Household Economics (1919 - Mar. 1, 1921).
B. S., University of Wyoming, 1919.

HENRY WHITE MARSTON, B. S. A., Graduate Assistant in Animal Husbandry (1919).
B. S. A., Delaware State College, 1919. Ag 13; 1020 Leavenworth.

WALTER RAWLINS HORLACHER, B. S., Graduate Assistant in Animal Husbandry (Sept. 1, 1920).
B. S., 1920. Ag 13A; 1642 Fairchild.

ELIZABETH EMILY KIRKPATRICK, B. S., Graduate Assistant in Food Economics and Nutrition (Sept. 1, 1920).
B. S., 1920. L 53; 1000 Bluemont.

OTHER OFFICERS

JESSIE McDOWELL MACHIR, College Registrar (1913).
A 29; 1641 Fairchild.

CLIFTON JAIRUS STRATTON, B. S., in Charge of Alumni and Student Relationships (Sept. 13, 1920).
B. S., 1911. A 28; 1329 Anderson.

ADRIAN AUGUSTUS HOLTZ, Ph. D., Men's Adviser and Secretary of Young Men's Christian Association (Aug. 27, 1919).
A. B., Colgate University, 1909; Ph. M., University of Chicago, 1910; B. D., *ibid.*, 1911; Ph. D., *ibid.*, 1914. A; 931 Leavenworth.

IRENE MAY DEAN, A. B., General Secretary, Young Women's Christian Association (Sept. 1, 1919).
A. B., Washburn College, 1914. L 39; 1641 Fairchild.

STEPHEN ARNOLD GEAUQUE, Assistant Custodian (1918, 1919).
G 33; 44 N. Ninth.

1. Resigned.

11. Absent on leave after Feb. 1, 1921; resigned.

Agricultural Experiment Station

OFFICERS OF THE STATION

W. M. JARDINE, President of the College.

ADMINISTRATION—

F. D. FARRELL, Director.

JAMES A. KIMBALL, Business Manager.

HUGH DURHAM, Assistant to Director.

AGRICULTURAL ECONOMICS—

W. E. GRIMES, Farm Management, in Charge.

R. M. GREEN, Marketing.

W. W. FETROW, Cost of Production.

R. D. NICHOLS, Cost of Production.

MORRIS EVANS, Farm Organization.

AGRONOMY—

L. E. CALL, in Charge.

S. C. SALMON, Crops.

R. I. THROCKMORTON, Soils.

J. H. PARKER, Plant Breeding.

M. C. SEWELL, Soils.

R. L. HENSEL, Pasture Investigations.

J. W. ZAHNLEY, Crops.

H. H. LAUDE, Coöperative Experiments.

N. E. DALE, Coöperative Experiments.

G. H. PHINNEY, Farm Foreman.

ELISABETH HARLING, Seed Analyst.

ANIMAL HUSBANDRY—

C. W. McCAMPBELL, Cattle, in Charge.

H. L. IBSEN, Animal Breeding.

F. W. BELL, Swine Investigations.

B. M. ANDERSON, Horse Investigations.

A. M. PATERSON, Sheep Investigations.

H. B. WINCHESTER, Feeding Investigations.

BACTERIOLOGY—

L. D. BUSHNELL, in Charge.

O. W. HUNTER, Dairy Bacteriology.

P. L. GAINES, Soil Bacteriology.

F. R. BEAUDETTE, Poultry Disease Investigations.

BOTANY—

L. E. MELCHERS, Plant Pathology, in Charge.

E. C. MILLER, Plant Physiology.

CHEMISTRY—

H. H. KING, in Charge.

J. T. WILLARD, Consulting Chemist.

C. O. SWANSON, General Investigations.

W. L. LATSHAW, Soil, Feeding-stuffs, and Fertilizer Analysis.

E. L. TAGUE, Protein Investigations.

J. S. HUGHES, Animal Nutrition.

R. N. LOOMIS, Agricultural Analysis.

H. ROBERT DE ROSE, Live-stock Remedy Analysis.

———, Animal Nutrition.

DAIRY HUSBANDRY—

J. B. FITCH, in Charge.
H. W. CAVE, Dairy Production.
G. A. MAXEY, Dairy Manufactures.
R. B. BECKER, in Charge Official Tests.
H. M. JONES, State Dairy Commissioner

ENTOMOLOGY—

G. A. DEAN, in Charge.
J. H. MERRILL, Apiculture, Fruit Insects.
J. W. MCCOLLOCH, Staple Crop Insect Investigations.
W. P. HAYES, Staple Crop Insect Investigations.
ROGER C. SMITH, Staple Crop Insect Investigations.

HORTICULTURE—

ALBERT DICKENS, in Charge.
R. J. BARNETT, Pomology.
W. F. PICKETT, Orchard Investigations.

MILLING INDUSTRY—

L. A. FITZ, in Charge.
LEILA DUNTON, Wheat and Flour Investigations.
C. W. OAKES, Miller.
A. E. LANGWORTHY, Feed Control.
F. M. AIMAN, Feed Control.
C. E. BUCHANAN, Feed Control.

POULTRY HUSBANDRY—

W. A. LIPPINCOTT, in Charge.
L. F. PAYNE, Incubation.
H. B. MUGGESTONE, Superintendent of Poultry Plant.

VETERINARY MEDICINE—

R. R. DYKSTRA, in Charge.
C. W. HOBBS, Field Veterinarian.
H. F. LIENHARDT, Pathology.
J. P. SCOTT, Blackleg Investigations.
N. D. HARWOOD, Vaccine Production.
C. A. KITSELMAN, Abortion Disease Investigations.

ZOOLOGY—

R. K. NABOURS, in Charge.
J. E. ACKERT, Parasitology.
CAROLINE PERKINS, Genetics.
F. L. HISAW, Injurious Mammals.

BRANCH EXPERIMENT STATIONS.

FORT HAYS—

H. L. KENT, Superintendent.
A. L. HALLSTED, Dry-farming Investigations.¹
R. E. GETTY, Forage Crop Investigations.¹
A. F. SWANSON, Cereal Crops.¹
C. R. JACCARD, Forest Nurseryman.

1. In coöperation with the U. S. Department of Agriculture.

GARDEN CITY—

F. A. WAGNER, Superintendent.

F. E. KEATING, Dry-land Agriculture Investigations.¹

COLBY—

J. J. BAYLES,* Superintendent.¹B. F. BARNES,† Superintendent.¹

TRIBUNE—

G. E. LOWREY, Superintendent.

* Till Dec. 31, 1920.

† Beginning Jan. 1, 1921.

Engineering Experiment Station

OFFICERS OF THE STATION

W. M. JARDINE, President of the College.

ADMINISTRATION—

R. A. SEATON, Director.

LOUISE SCHWENSON, Secretary.

APPLIED MECHANICS AND MACHINE DESIGN—

R. A. SEATON, in Charge.

C. E. PEARCE, Machine Design.

C. H. SCHOLER, Materials of Construction.

A. D. CONROW, Assistant in Road Materials.

J. H. ROBERT, General Investigations.

C. R. DAWLEY, Assistant in Materials of Construction.

ARCHITECTURE—

C. F. BAKER, in Charge.

J. D. WALTERS, General Investigations.

———, Rural Architecture.

ARTHUR LEE, General Investigations.

CHEMISTRY—

H. H. KING, in Charge.

P. J. NEWMAN, General Investigations.

CIVIL ENGINEERING—

L. E. CONRAD, in Charge.

F. F. FRAZIER, General Investigations.

M. W. FURR, Highway Engineering.

L. V. WHITE, Assistant.

L. H. FOX, Assistant.

ELECTRICAL ENGINEERING—

C. E. REID, in Charge.

R. G. KLOEFFLER, General Investigations.

J. L. BRENNEMAN, General Investigations.

H. B. BECKWITH, Assistant.

FARM ENGINEERING—

———, in Charge.

W. H. SANDERS, Tractors.

R. H. DRIFTMIER, Farm Machinery.

PHYSICS—

J. O. HAMILTON, in Charge.

G. E. RABURN, General Investigations.

SHOP PRACTICE—

W. W. CARLSON, in Charge.

E. C. JONES, General Investigations.

G. A. SELLERS, Assistant.

D. E. LYNCH, Assistant.

STEAM AND GAS ENGINEERING—

J. P. CALDERWOOD, in Charge.

A. J. MACK, General Investigations.

C. J. BRADLEY, Assistant.

History of the College

The Kansas State Agricultural College had its origin in the Bluemont Central College, an institution established at Manhattan under the control of the Methodist Episcopal Church of Kansas. The charter for this sectarian institution, approved February 9, 1858, provided for the establishment of a classical college, but contained the following interesting section:

"The said association shall have power and authority to establish in addition to literary departments of arts and sciences, an agricultural department, with separate professors, to test soils, experiment in the raising of crops, the cultivation of trees, etc., upon a farm set apart for the purpose, so as to bring out to the utmost practical results the agricultural advantages of Kansas, especially the capabilities of the high prairie lands."

The corner stone of the new College was laid on May 10, 1859, and instruction began about a year later. On March 1, 1861, a bill passed the legislature establishing a state university at Manhattan, the Bluemont Central College building to be donated for the purpose. This measure, however, was vetoed by Governor Robinson.

On July 2, 1862, President Lincoln signed the Morrill Act, "An act donating public lands to the several states and territories which may provide colleges for the benefit of agriculture and the mechanic arts." Section 1 of this act provides—

"That there be granted to the several states, for the purposes herein-after mentioned, an amount of public lands to be appropriated to each state a quantity equal to 30,000 acres for each senator and representative in Congress to which the states are respectively entitled by the apportionment under the census of 1860."

Section 4 requires that the money from the sale of these lands—

"Shall constitute a perpetual fund, the capital of which shall remain forever undiminished, and the interest of which shall be inviolably appropriated by each state which may take and claim the benefit of this act to the endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislature of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

Because of the nature of the endowment made by Congress, the institutions founded in accordance with this act are generally known as the "land-grant" colleges. It may well be said that this was the most far-reaching and statesmanlike stroke of educational policy that any government has ever initiated.

On February 3, 1863, Governor Carney signed a joint resolution passed by the Kansas legislature, in accordance with which the provisions of the Morrill Act "are hereby accepted by the state of Kansas;

and the state hereby agrees and obligates itself to comply with all the provisions of said act." On February 16 of the same year the governor signed an act which permanently located the College at Manhattan, and provided—

"That the location of the said college is upon this express condition, that the Bluemont Central College Association . . . shall . . . cede to the state of Kansas, in fee simple, the real estate, . . . together with all buildings and appurtenances thereunto belonging; and shall . . . transfer and deliver to said state the apparatus and library belonging to said Bluemont Central College Association."

The three commissioners appointed by the governor selected 82,313.52 acres of the 90,000 granted by Congress. The deficiency of 7,686.48 acres was not made up by Congress till 1907.

After the passage of the creative act, no subsequent legislation was enacted by the Federal government with reference to the land-grant colleges until the second Morrill Act, for the further endowment of agricultural colleges, was passed. This bill received the signature of President Harrison on August 30, 1890. This act applied—

"A portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provisions of an act of Congress approved July second, eighteen hundred and sixty-two."

It provided—

"That there shall be and hereby is annually appropriated, out of any money in the treasury not otherwise appropriated, arising from the sales of public lands, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established or which may be hereafter established, in accordance with an act of Congress approved July 2, 1862, the sum of \$15,000 for the year ending June 30, 1890, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of \$1,000 over the preceding year, and the average amount to be paid thereafter to each state and territory shall be \$25,000, to be applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematics, physical, natural and economic science, with special reference to the industries of life, and to the facilities for such instruction."

The third and last act of Congress increasing the income of agricultural colleges is the Nelson amendment to the agricultural appropriation bill, which was approved March 4, 1907. In addition, however, to providing for an increase in the support of these institutions from Federal funds, the law contains the very significant provision specially authorizing the agricultural colleges to use a portion of this Federal appropriation for the special preparation of instructors for teaching agriculture and mechanic arts. The essential features of the Nelson amendment are embodied in the following quotations from the bill:

"That there shall be and hereby is annually appropriated out of any money in the treasury not otherwise appropriated, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of agricultural colleges now established, or which may hereafter be established, in accordance with the act of Congress approved July 2, 1862, and the act of Congress approved August 30,

1890, the sum of \$5,000, in addition to the sums named in the said act, for the fiscal year ending June 30, 1908, and an annual increase of the amount of such appropriation thereafter for four years by an additional sum of \$5,000 over the preceding year, and the annual sum to be paid thereafter to each state and territory shall be \$50,000, to be applied only for the purposes of the agricultural colleges as defined and limited in the act of Congress approved July 2, 1862, and the act of Congress approved August 30, 1890: *Provided*, That said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts."

THE DEVELOPMENT OF THE KANSAS AGRICULTURAL COLLEGE

The President and Faculty of the Bluemont Central College became the first board of instruction of the Kansas State Agricultural College, when the former institution was transferred to the state and assumed its present name. The Bluemont Central College was a small institution of the older American classical type, the curriculum resting upon Greek, Latin, and mathematics as the chief of fundamentals. Its transfer to the state, and its conversion into the State Agricultural College, involved at the time merely a change in name. The President and Faculty and the curriculum remained unchanged. The second catalogue, that of 1864-'65, mentions an "agricultural" course, comprising one preparatory and two collegiate years; but, although this course was strengthened from time to time, the classical studies nevertheless remained until the year 1873, when the character of the institution was radically changed. Intensely practical courses replaced the then existing ones. The new scheme of instruction involved the abolition of the classical course, and the introduction of a practical scheme of industrial education, which comprised a farmer's course of six years, a mechanic's course covering four years, and a woman's course requiring six years. Strong opposition to the new educational policies was encountered, but the authorities of the institution adhered to them unswervingly, until the complete success of the new method silenced criticism. Thus the institution became in fact what it had hitherto been only in name—an agricultural college. In 1879 the Faculty consisted of the President, five professors, and six instructors of lesser rank, with a student body of 207. During this period of development the College was removed from the original Bluemont College site to its present campus, two miles nearer Manhattan.

From 1879 to 1897 no great changes were made in the courses of study, but the work was systematized and strengthened in many directions, retaining, however, the distinctive stamp of a college related to the industries. In 1897 the student enrollment was 734. The Faculty had grown in numbers, and the activities of the institution along investigative lines had been well begun through the organization of the Agricultural Experiment Station. Beginning with 1897, the greater stress was laid upon the study of financial, economic, and social problems. Several men of considerable note were added to the Faculty for the purpose of strengthening these phases of educational work. In 1897 four professional courses, each four years in length, were organized—in agri-

culture, in mechanical engineering, in domestic science, and in general science. These years, therefore, mark the beginning of an era of broadening and diversification of the lines of instruction.

In 1899 the administration of the institution changed, and during the years that have followed the institution has experienced an era of solid, substantial, and uninterrupted growth, gaining steadily in recognition and in influence over the state. The number of professors and other instructors and the student enrollment grew steadily throughout this period up to the time of the outbreak of the war, when this College, along with all others, suffered heavily. Since 1899 additional buildings to the value of about \$500,000 have been erected on the campus.

The history of the Kansas State Agricultural College may well be divided into five epochs. The first ten years, from 1863 to 1873, may be called the classical period of the College. The succeeding period, from 1873 to 1879, was the formative stage, the years of the foundation of the Agricultural College properly so called, and bore the stamp of a spirit of pure industrialism of the most intensely "practical" type.

The next eighteen years, from 1879 to 1898, may be called the scientific culture period—a period in which, under modified ideals, the institution was sought to be used not so much as a tool to teach young men and women how to make a living as to teach them *how to live*, and strove to accomplish the end of character building by means of scientific and technical training having especial reference to agriculture.

Expansion of courses, with consequent increased flexibility, plasticity, and adaptability of the means of instruction to the various ends of industrial life, marked the following epoch of twelve years. In this period we see a rising tendency toward an increased acknowledgment of the Agricultural College as the guardian and custodian of the state's industrial interests, and a steady growth of settled confidence over the state in its ability to solve the state's industrial problems.

The present time, therefore, finds the College and its inseparable coadjutors, the Experiment Stations, occupying a position of far-reaching power and influence in connection with the most vital interests of the state of Kansas.

The Agricultural College accomplishes the objects of its endowment in several ways. It offers a substantial training in mathematics, in the fundamental sciences, in language, in history and civics, and in such other branches of human knowledge as experience has shown to be best adapted to give mental discipline, to develop good citizenship, and to furnish a proper equipment for entering upon active life. The combination of industrial training with the usual class and laboratory work has a special educational value. By the training of the hands the student is made more efficient in every way, is brought into contact with practical things, and is educated toward, rather than away from, an interest in industry and manual exertion. The general training which the College offers aims, therefore, at an equally efficient development of the physical and the mental powers. The greatest immediate aid to improvement in social well-being and to betterment of the conditions of life is a thorough knowledge of science as applied to daily existence. In chemistry and

physics, in geology, in botany, in bacteriology, in entomology, in mechanics, the student is brought to an understanding of the relation of man to the world around him, and to a knowledge of how to utilize natural forces for the protection and improvement of his own life.

The College trains directly toward the productive occupations in a considerable number of specialized branches. For example: In agriculture, the student may specialize in agronomy, horticulture, forestry, animal husbandry, dairying, poultry husbandry, or veterinary science. In engineering, the student may take work in mechanical, electrical, or civil engineering, architecture, or any of the various special courses for mechanics. For young women, training is offered in household economics, nutrition, food economics, clothing and textiles, home furnishing, home decoration, etc.

A second large object of the College, made effective through the Experiment Stations, is to investigate the problems of agriculture and the industries. By conducting the researches of the Experiment Stations in close connection with the educational work of the College opportunity is afforded students to gain an understanding and an appreciation of the work of scientific investigation, and to become better able to appreciate the relation of science to agriculture. Opportunity is thus also offered to obtain such training as will fit competent students to become investigators, and to enter fields of agricultural leadership in the experiment stations in the United States Department of Agriculture, as heads of private agricultural enterprises, or in the capacity of superintendents and managers of such undertakings.

In addition to the regular educational work, the College now maintains, through the Division of College Extension, a highly organized system of agricultural education among the farmers themselves. A corps of trained and efficient institute lecturers hold meetings in every county in the state, conduct seed trains, dairy trains, corn trains, alfalfa trains, and poultry trains, and publish two series of pamphlets of information and instruction—one for rural teachers, the other for members of farmers' institutes. In addition to the regular staff of the Division of College Extension, many members of the College Board of Instruction, and of the staff of the Experiment Station, give several weeks of each year to the public work of the farmers' institutes.

Finally, the College and the Station together are being increasingly charged by the state government with state industrial and police duties, such as pure-food investigations, control of feeding stuffs and fertilizers, state forestry work, and other similar duties.

The Agricultural Experiment Station

The Kansas Agricultural Experiment Station was organized under the provisions of an act of Congress, approved March 2, 1887, which is commonly known as the "Hatch Act," and is officially designated as—

"An act to establish agricultural experiment stations in connection with the colleges established in the several states under the provisions of an act approved July 2, 1862, and the acts supplementary thereto."

The wide scope and far-reaching purposes of this act are best comprehended by an extract from the body of the measure itself, in which the objects of its enactment are stated as being—

"To aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and practice of agricultural science."

The law specifies in detail—

"That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and waters; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses for forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable."

On the day after the Hatch Act had received the signature of the President, the legislature of Kansas, being then in session, passed a resolution, dated March 3, 1887, accepting the conditions of the measure, and vesting the responsibility for carrying out its provisions in the Board of Regents of the Kansas State Agricultural College.

Until 1908 the expenses of the Experiment Station were provided for entirely by the Federal government. The original creative act (the Hatch Act) carried an annual congressional appropriation of \$15,000. No further addition to this amount was made until the passage of the Adams Act, which was approved by the President March 16, 1906. This measure provided, "for the more complete endowment and maintenance of agricultural experiment stations," a sum beginning with \$5,000, and increasing each year by \$2,000 over the preceding year for five years, after which time the annual appropriation was to be \$15,000—

"To be applied to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States, having due regard to the varying conditions and needs of the respective states or territories."

It is further provided that—

“No portion of said moneys exceeding five percentum of each annual appropriation shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings, or to the purchase or rental of land.”

The Adams Act, providing as it does for original investigations, supplied the greatest need of the Experiment Station—means of providing men and equipment for advanced research. Only such experiments may be entered upon, under the provisions of this act, as have first been passed upon and approved by the Office of Experiment Stations of the United States Department of Agriculture.

In the neighborhood of sixty projects, covering practically all phases of agricultural investigation, are being studied by the members of the Experiment Station staff.

The farms, live stock, laboratories, and general equipment of the College are all directly available for the use of the Experiment Station.

The results of the work of the Experiment Station are published in the form of bulletins, circulars, and scientific papers other than bulletins and circulars. These bulletins are of two classes—those which record the results of research work of a purely scientific character and those which present technical information in a simplified form, suitable for the general reader. The circulars are brief and condensed popular presentations of data which call for immediate application, as well as timely and useful information not necessarily new or original. The scientific papers are usually published as reprints or addresses given before scientific bodies. These reprints contain original information or report definite steps in the progress of investigations under way.

All bulletins and other publications from the Experiment Station are sent without charge to citizens of the state. Any person in the state who so desires may have his name placed on the permanent mailing list of the Station.

Letters of inquiry and general correspondence should be addressed: “Agricultural Experiment Station, Manhattan, Kan.” Special inquiries should be directed, so far as possible, to the heads of departments having in charge the matters concerning which information is desired.

CONTROL WORK OF THE STATION

In addition to the work of agricultural investigation, the state has enlarged the activities of the Station along various lines of state executive or control work.

One of the important lines of control work is that of state dairy commissioner. This official, appointed by the Board of Administration, and having his office at the seat of the Agricultural College, is required (Laws of 1909, ch. 237)—

“To inspect or cause to be inspected all the creameries, public dairies, butter, cheese and ice-cream factories, or any place where milk or cream or their products are handled or stored within the state, at least once a year, or oftener if possible.”

He may in connection with the Board of Administration of the College—

“Formulate and prescribe such reasonable rules and regulations for the operation of creameries, butter, cheese and ice-cream factories and public dairies as shall be deemed necessary by such board to fully carry out the provisions of this act.”

He may act on complaints regarding the sale of unwholesome or unclean dairy products, and may prohibit their sale. He may—

“Condemn for food purposes all unclean or unwholesome milk, cream, butter, cheese or ice cream, wherever he may find them.”

Another important state function is that of the State Entomological Commission. (Laws of 1907, ch. 386; 1909, ch. 27.) This commission, created in 1907, was established—

“To suppress and eradicate San José scale and other dangerous insect pests and plant diseases throughout the state of Kansas.”

The professors of entomology at the Agricultural College and at the University of Kansas are by law designated as two of the five members of the above commission. Acting under the title of state entomologist, they divide between them the territory of the state, for the purpose of inspection.

They are empowered—

“To enter upon any public premises . . . or upon any land of any firm, corporation or private individual within the state of Kansas, for the purpose of inspection, destroying, treating, or experiment upon the insects or diseases aforesaid.”

They may treat or cause to be treated “any and all suspicious trees, vines, shrubs, plants, and grains,” or, under certain conditions, may destroy them. They must annually inspect all nursery stock, and no nursery stock is to be admitted within the state without such inspection.

Concerned with the live-stock interests of the state is the State Live Stock Registry Board, with regard to which there is the following provision (Laws of 1913):

“Every person, persons, firm, corporation, company or association that shall stand, travel, advertise or offer for public service in any manner any stallion in the state of Kansas, shall secure a license certificate for such stallion from the Kansas State Live Stock Registry Board, as herein provided. Said board shall consist of the dean of the Division of Agriculture, head of the Animal Husbandry Department, and the head of the Veterinary Department of the Kansas State Agricultural College.”

To this board is assigned the duty of licensing stallions used for breeding purposes within the state, and authority to verify their breeding and to classify them under the following heads: pure bred, grade, crossbred, and scrub. No animal not thus approved and licensed with the board is permitted to be used for public breeding purposes.

By legislative act (Laws of 1909, ch. 49), a “division of forestry” at the Agricultural College is also provided for in the following terms:

“For the promotion of forestry in Kansas there shall be established at the Kansas State Agricultural College, under the direction of the Board

of Regents, a division of forestry. The Board of Regents of the Kansas State Agricultural College shall appoint a state forester, who shall have general supervision of all experimental and demonstration work in forestry conducted by the Experiment Station. He shall promote practical forestry in every possible way, compile and disseminate information relative to forestry, and publish the results of such work through bulletins, press notices, and in such other ways as may be most practicable to reach the public, and by lecturing before farmers' institutes, associations, and other organizations interested in forestry."

The state has also placed the Experiment Station in charge of the execution of the acts concerning the manufacture and sale of live-stock remedies and commercial feeding stuffs (Laws of 1913), and also of commercial fertilizers (Laws of 1907, chapter 217). It is provided by the statutes that every brand of live-stock remedy and every brand of commercial feeding stuffs offered or held for sale or sold within the state of Kansas shall be registered in the office of the Director of the Agricultural Experiment Station of the Kansas State Agricultural College, and each sale of any such brand not so registered shall constitute a separate violation of this act.

And—

"Except as herein provided, it shall be unlawful within the state of Kansas to sell, offer for sale, or expose for sale any commercial fertilizer which has not been officially registered by the Director of the Agricultural Experiment Station of the Kansas State Agricultural College."

These general provisions are limited in their application by important exceptions stated in the laws. The fees collected under these acts are used to defray the necessary expenses incurred in carrying out the provisions of the acts.

It will thus be seen that the state of Kansas is making increasing use of the scientific staff of the Experiment Station in matters of state importance requiring the application of technical knowledge.

Branch Agricultural Experiment Stations

FORT HAYS BRANCH STATION

The land occupied by this Station is a part of what was originally the Fort Hays military reservation. Being no longer required for military purposes, it was turned over to the Department of the Interior, October 22, 1899, for disposal under the act of Congress of July 5, 1884. Before final disposition of this land was made, however, the Kansas legislature, in February, 1895, passed a resolution requesting the Congress of the United States to donate the entire reservation of 7,200 acres to the state of Kansas for the purposes of agricultural education and research, for the training of teachers, and for the establishment of a public park. Bills giving effect to this request were introduced into Congress without avail, until the fifty-sixth Congress when, through the influence of Senator, later Regent, W. A. Harris, and of Congressman Reeder, a bill was passed, setting aside this reservation "for the purpose of establishing an experimental station of the Kansas Agricultural College and a western branch of the Kansas State Normal School thereon and a public park." This bill was approved by the President on March 28, 1900. By act of the state legislature, approved on February 7, 1901, the act of Congress donating this land and imposing the burden of the support of these institutions was accepted. The same session of the legislature passed an act providing for the organization of a branch experiment station and appropriating a small fund for preliminary work. In the division of this land, the College received 3,560 acres.

The land at the Fort Hays Branch Station consists mainly of high, rolling prairie, with a limited area of rich alluvium bordering on a creek, and is situated on the edge of the semi-arid plains region. It is well suited for experimental and demonstration work in dry farming, in irrigation, and in crop, forestry, and orchard tests, under conditions of limited rainfall and high evaporation.

The work of this Station may be divided into two divisions: (A) experimental projects, (B) general farm and live-stock work. The experimental projects are as follows: Dry-farming investigations, forage-crop investigations, cereal-crop investigations, forest, nursery and park demonstrations and investigations, farm dairying, and experiments in the feeding and breeding of live stock. All this work is confined to the study of the problems peculiar to the western half of the state, and relates especially to crop production under limited rainfall, to the development of varieties better adapted to the climatic conditions there prevailing, and to studies of the systems of animal husbandry and dairy husbandry suited to this region. The facilities of this Station are being used for the growing of large quantities of pure seed of the strains and varieties which have proved in actual test to be most productive in the western part of the state.

GARDEN CITY BRANCH STATION

In 1906 the county commissioners of Finney county purchased, for purposes of agricultural experimentation, a tract of land amounting to 320 acres, situated four and one-half miles from Garden City, on the unirrigated upland.

The land has been leased for a term of ninety-nine years to the Kansas Agricultural Experiment Station as an "experimental and demonstration farm," for the purpose of determining the methods of culture, crop varieties, and crop rotations best suited to the southwestern portion of the state, under dry-land farming conditions. A pumping plant irrigating from eighty to one hundred acres has been installed for the purpose of investigating the expenses of pumping and the cost of equipment necessary for plants of this type, which are common in the shallow-water districts between Garden City and Scott City and along the Arkansas valley. The Experiment Station's investigations in irrigation agriculture are centered at this branch station.

COLBY BRANCH STATION

The legislature of 1913 provided for the establishment of a branch experiment and demonstration station near Colby, in northwestern Kansas, "for the purpose of advancing and developing the agricultural, horticultural, and irrigation interests of this state and western Kansas." This Station was located upon a tract of three hundred and fourteen acres of land bordering upon the town site of Colby. This land was purchased by the county and deeded to the state for the purposes named above. Operations were begun in March, 1914. Cropping experiments are being conducted under dry-land conditions and under irrigation. Water is being lifted one hundred and fifty feet for irrigating a garden, fruit trees, and a few desirable crops, such as alfalfa, that could not be grown successfully in western Kansas with the natural rainfall. The primary purpose of the Colby Station is to determine the best methods of developing the agriculture of northwestern Kansas and to make it a still more desirable place to live.

TRIBUNE BRANCH STATION

At the Tribune Station experimental and demonstration work is conducted for the benefit of the surrounding territory. Special attention is paid to the problems of producing, storing, and utilizing crops for winter feeding of cattle which in summer graze the extensive range areas of the extreme western part of the state.

The Engineering Experiment Station

The Engineering Experiment Station was established for the purpose of carrying on tests and research work of engineering and manufacturing value to the state of Kansas, and of collecting, preparing, and presenting technical information in a form readily available for the use of the various industries within the state. It is the intention to make all the work of the Experiment Station of direct importance to Kansas.

All of the equipment of the various engineering and scientific laboratories, the shops, and the College power plant are available for this work, while the personnel of the Station staff is made up of professors and instructors from the various departments of the Division of Engineering and from other scientific departments whose work is directly related to the work of this division.

Among the tests now being carried on are: investigations on the strength of concrete; the road-making properties of various Kansas stones, gravels, and sands; the relative costs of concrete of a given quality when made with and without coarse aggregates; bituminous sand cushions for brick roads; power-plant economics; the use of the windmill for driving electric generators for farm lighting; the losses in electric transmission lines, and in town and city distribution systems; the mechanical and electrical properties of commercial copper wire used in pole-line construction; the economy of electric cooking and heating devices; and the effect of chemical composition on the durability and protective power of paints.

Various other investigations are being carried on upon brick, concrete, fuels, lubricating oils, pipe coverings, insulation for refrigeration, belt lacings, glued joints, blacksmith coals, foundry sands, centrifugal pumps, and problems in farm architecture.

Records have been obtained of the discharge of the Kansas river, and it is hoped that a gauge can be installed at some future date, so that a continuous record can be made of the stage of the river at Manhattan, to be used in computing the flood discharge of that stream, as a basis for designing works for flood protection.

The testing laboratories of this Station have been designated by law* as the testing laboratories for the State Highway Commission and the state highway engineer, and as such have charge of the testing of all road materials for use in Federal-aid road construction in this state.

The results of the investigations are published as bulletins and circulars of the Engineering Experiment Station, which are sent free to any citizen of the state upon request. Besides issuing these bulletins, the Station answers yearly many hundreds of requests for information upon matters coming within its field.

Requests for bulletins and general correspondence should be addressed to Engineering Experiment Station, Manhattan, Kan. Requests for information in specific matters should be addressed, so far as it is possible, to the heads of departments in whose fields the particular matters lie.

* Sec. 5, ch. 64, Laws of 1917.

Grounds, Buildings, and Equipment

The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric-car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses, and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens, and experimental fields. Broad, well-shaped macadamized avenues lead to all parts of the grounds. Cement walks connect the buildings with one another and with the entrances. Including the campus of 160 acres, the College owns 1,136 acres of land at Manhattan, valued at \$340,600. Outside the campus proper, all of the land is devoted to educational and experimental work in agriculture. Within the College grounds, most of the space not occupied by buildings and needed for drives and ornamental plantings is devoted to orchards, forest and fruit nurseries, vineyards, and gardens. A number of fields in the northern and western portions of the campus are used for general experimental work by various departments.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of limestone obtained from the College quarries. These buildings are listed below.

ANDERSON HALL. Erected, 1879; cost, \$79,000; dimensions, 152 x 250 feet; two stories and basement. Contains the offices of administration of the College, a social center hall, the College post office, offices of the Division of College Extension and of the Department of Student Health, and offices and classrooms of the Departments of Architecture, Economics, Education, English, Applied Art, and Mathematics. Value of equipment, \$34,707.*

AUDITORIUM. Erected, 1904; cost, \$40,000; dimensions, 113 x 125 feet. Has a large stage with drop curtain and scenery. Seating capacity, 2,300. Contains also the offices and music rooms of the Department of Music. Value of equipment, \$7,146.

CHEMISTRY ANNEX. Erected, 1876; cost, \$8,000; dimensions, 35 x 110 and 46 x 175 feet, in the form of a cross. Originally erected as a chemical laboratory. Reconstructed at a cost of \$5,000 after a fire in 1900, the building was used from 1902 to 1911 as a women's gymnasium; since 1911, used by the Department of Chemistry. Value of equipment, \$19,296.

DAIRY COMMISSION HALL. Erected, 1888; cost, \$5,000; dimensions, 30 x 30 feet; one story and basement. Used for many years by the Department of Horticulture and Entomology, then for horticultural work when that was made a separate department. Contains offices occupied by the state dairy commissioner. Value of equipment, \$1,074.

* The figures for equipment are taken from the reports of June 30, 1920.

DAIRY HALL. Erected, 1904; cost, \$15,000; dimensions, 72 x 103 feet, one story and basement. Contains butter-manufacturing rooms, hand-separator room, laboratory, classroom, three offices, and two refrigerating rooms. Occupied entirely by the Department of Dairy Husbandry. Value of equipment, \$6,727.

DENISON HALL. Erected, 1902; cost, \$70,000; dimensions, 96 x 166 feet; two stories and basement. The east wing is occupied throughout by the laboratories, classrooms and offices of the Department of Chemistry. The west wing is occupied by the Department of Electrical Engineering and by the Department of Physics. Value of equipment: Chemistry, \$34,581; Custodian, \$1,142; Electrical Engineering, \$31,227; Executive, \$947; Physics, \$16,077.

ENGINEERING HALL. The main portion of this building is now under construction at a cost of \$190,000. The east wing, erected in 1909, cost \$80,000. Dimensions of part now under construction, 60 x 236 feet; three and four stories in height, fireproof construction throughout. Dimensions of the east wing, 113 x 200 feet; three stories in height, but much of it built on the gallery plan rather than by complete floor separation into different stories. This building will contain, when completed, the general offices and library of the Division of Engineering, and the offices, drafting rooms and laboratories of the Departments of Applied Mechanics, Architecture, Civil Engineering, Electrical Engineering, and Steam and Gas Engineering. The engines, turbines, generators and boilers that furnish power and light for the College are also installed in this building. Value of equipment, \$58,940.

ENGINEERING SHOPS. These consist of several connected structures, erected at different times. The original building, now used as the wood-working shop, was erected in 1876; a series of additions having later been successively made, the present group is the result. The cost of the whole amounts to \$35,000. A portion of the building is two stories high. On the upper floor, which has a floor area of 9,260 square feet, are classrooms, drafting rooms, pattern storage room, and offices of the Department of Applied Mechanics and Machine Design, and Shop Practice. The woodworking shop (35 x 219 feet) is equipped with the necessary bench tools and woodworking machinery. Adjoining is the machine shop (40 x 170 feet), supplied with benches and tools and amply equipped with the necessary machine tools. The blacksmith shop (50 x 100 feet) contains 35 forges of modern type, connected with power blast and down-draft exhaust. Adjoining is the lecture hall, with demonstration forge and equipment. The iron foundry (27 x 100 feet) and brass foundry (24 x 34 feet) are well supplied with the necessary equipment. The wash and locker room (36 x 40 feet) contains 250 steel lockers. A general supply room (22 x 24 feet) is conveniently located for storing the necessary small supplies. Value of equipment, \$52,485.

FAIRCHILD HALL. Erected, 1894; cost, \$67,750; dimensions, 100 x 140 feet; two stories, basement, and attic. On the first floor are the College Library and reading rooms, a newspaper reading room, offices of the Librarian and his assistants, and the general museum. On the second floor are the offices, classrooms and laboratories of the Departments of

Zoölogy, Entomology, and of History and Civics. The museums of natural history are placed here also. The basement is occupied largely by recitation rooms and offices of the Department of History and Civics. Value of equipment: Custodian, \$681; Entomology, \$14,573; History and Civics, \$920; Library, \$153,500; Zoölogy, \$18,236.

FARM BARN. Erected, 1913; cost, \$25,000; dimensions, 80 x 160 feet; two stories and basement. Consists of three sections, arranged like the letter H, and a glazed tile silo of 200 tons capacity. The west wing contains nine box stalls and twenty-six single stalls, equipped with sanitary feed mangers and racks, and is designed especially for the housing of horses. The east wing contains twelve box stalls and thirty single stalls for the breeding cattle and the show herd. The central section has an office, feed rooms, a washing floor, and a basement containing the engine room. The loft, to which a driveway leads, has storage space for ten carloads of grain and 100 tons of hay and straw and contains the grinding apparatus. This barn is used by the Department of Animal Husbandry.

FARM MACHINERY HALL. Erected, 1870; cost, \$11,250; dimensions 46 x 95 feet; two stories. The first building erected on the present campus. Originally designed as a College barn, and first used for that purpose. Later used as a general College building, then by the Department of Botany, and afterwards by the Department of Veterinary Medicine. The first floor, a large hall, was used by the Department of Military Science for many years as an armory. The entire building has been given over for the use of the Department of Farm Engineering, and is filled with all types of farm machinery. Value of equipment: Custodian, \$129; Farm Engineering, \$3,003.

HOME ECONOMICS HALL. Erected, 1908; cost, \$70,000; dimensions, 92 x 175 feet; two stories and basement. The first floor and basement are occupied by the laboratories, classrooms, and offices of the Departments of Food Economics and Nutrition, and Household Economics; the second floor is occupied by the laboratories, classrooms, and offices of the Department of Clothing and Textiles. Value of equipment: Clothing and Textiles, \$5,846; Custodian, \$580; Dean's offices, \$2,649; Food Economics and Nutrition, \$10,102; Household Economics, \$3,021.

HORTICULTURAL BARN. Erected, 1917; cost, \$1,500; dimensions, 38 x 55 feet. Two stories, first story stone, second story frame. This building is located one mile west of the College campus.

HORTICULTURAL HALL. Erected, 1907; cost, \$50,000; dimensions, 72 x 116 feet. This building, one of the best and most commodious on the campus, is now used by the Departments of Botany and Horticulture. Its classrooms, laboratories, museums, and equipment are modern and ample. Value of equipment: Botany, \$23,318; Custodian, \$607; Horticulture, \$10,713.

ILLUSTRATIONS HALL. Erected, 1877; cost, \$4,000; dimensions, 32 x 80 feet; one story and basement. At an early period used as a horticultural hall; later the headquarters for general College repairs; since the summer of 1919 used by the Department of Illustrations. Value of equipment, \$1,622.

INFIRMARY. Erected, previous to 1884; rebuilt, 1919; dimensions, 34 x 34 feet; two stories. Originally a farm house, later used as dwelling by the Professor of Agriculture and more recently by the Custodian. Contains separate wards for men and women, five rooms in each ward.

KEDZIE HALL. Erected, 1897; cost, \$16,000; dimensions, 70 x 84 feet; two stories and basement. Used from its erection till 1908 by the Departments of Domestic Science and Domestic Art. Basement occupied by the printing plant; first floor taken up by the cafeteria since the summer of 1915, and by offices of the Department of English; second floor divided into general classrooms and offices used by the Departments of Industrial Journalism and Printing, and English. Value of equipment: Cafeteria, \$8,923; Custodian, \$212; English, \$1,027; Industrial Journalism and Printing, \$13,123.

NICHOLS GYMNASIUM. Erected, 1911; cost, \$122,000; dimensions, 102 x 221 feet; three stories and basement. The building consists of a main section and two wings. The main section (85 x 141 feet), consisting of two stories and a basement, is used as a men's gymnasium and armory, and contains a running track, sixteen laps to the mile. The east half of the basement of the main section contains a swimming pool, baths, rest room, etc., for women; the west half contains a swimming pool and baths for men. The east wing (40 x 102 feet) contains the women's gymnasium, classrooms and offices of the Department of Military Training, and several literary society halls. The west wing (40 x 102 feet) contains the offices of the Director of Athletics and Physical Education, a large locker room for men, classrooms and offices of the Department of Modern Languages, and several literary society halls. This building is constructed on the old armory-castle type and is modern in every respect. Value of equipment, \$7,240.

SCHOOL OF AGRICULTURE HALL. Erected, 1900; cost, \$25,000; dimensions, 90 x 95 feet; two stories and basement. Occupies the original site of the President's house, destroyed by lightning in 1896. Contains classrooms and offices of the School of Agriculture and of the Department of Public Speaking. Value of equipment, \$3,724.

VETERINARY HALL. Erected, 1908; cost, \$70,000; dimensions, 133 x 155 feet; two stories and basement. Occupied by the laboratories, demonstration and dissecting rooms, classrooms, and offices of the Department of Anatomy and Physiology, Bacteriology, Pathology, and Vaccine Laboratories, and by the offices of the Dean of the Division of Veterinary Medicine. Value of equipment, \$33,952.

WATERS HALL. Erected, 1912; cost of portions now completed, \$125,000; cost of building when developed and completed as planned, \$500,000. The completed building will consist of a central portion (130 x 80 feet), with basement and three stories; of two wings (each 80 x 169 feet), with basement and three stories, and with a sub-basement under half of the east wing; and of a stock-judging pavilion placed back of the central portion and between the wings. This pavilion is now completed, and contains tie and box stalls and two large stock-judging rooms (45 x 100 feet), each having a seating capacity of 475. Each of these

rooms may be divided into two, with a passage between, by the use of curtains. The east wing of the building is used by the Departments of Agricultural Economics, Agronomy, Animal Husbandry, Milling Industry, and Poultry Husbandry. This wing contains, besides offices and recitation rooms of these departments and the general offices of the Agricultural Experiment Station and of the dean of the division, a complete small flour mill, and laboratories for grain judging. Value of equipment, \$39,953.

In addition to the substantial stone buildings mentioned above the College has a number of other buildings, among them the following:

EXPERIMENT STATION BUILDING. Erected, 1918; dimensions, 40 x 176 feet; two stories. Built as barracks No. 4 for the S. A. T. C., now used by the Agricultural Experiment Station.

GENERAL PURPOSE BUILDING. Erected, 1918; dimensions, 40 x 80 feet; two stories. Built as barracks No. 6 for the S. A. T. C. The east half of the first floor is used by the Department of Music; the west half of the second floor is used by the Department of Electrical Engineering; and the east half of the second floor is used for the storage of auto parts.

GREENHOUSES. Erected, 1909; cost, \$7,000; dimensions, 114 x 150 feet. Contains six sections used by various departments as follows: Horticulture, three; Botany, one; Agronomy, one; Entomology and Zoölogy, one. Value of equipment, \$4,200.

MESS HALL. Erected, 1918; dimensions, 42 x 176 feet; two stories. Built for the S. A. T. C. as mess hall and still used for that purpose. Value of equipment; \$1,182.

PLANT MUSEUM. Erected, 1907; cost, \$2,500; dimensions, 20 x 100 feet. Used by the Department of Horticulture. Contains a large number of rare growing plants, including many subtropical species. Value of equipment, \$600.

REPAIR SHOP. Erected, 1918; dimensions, 40 x 176 feet; one story. Built as barracks No. 1 for the S. A. T. C. Value of equipment, \$27,123.

SERUM BARN. Erected, 1914; cost, \$3,000; dimensions, 92 x 96 feet; contains 30 pens, each 8 x 12 feet, and two feed rooms of the same dimensions. This is a frame and cement building situated three-quarters of a mile north of the College campus.

SERUM PLANT. Erected, 1914; cost, \$7,000; constructed of brick; dimensions, 20 x 60 feet; two stories. Value of equipment, \$6,456.

TRACTION ENGINE LABORATORIES. Erected, 1918; cost, \$20,000; two buildings, each 40 x 176 feet. These are two frame buildings on concrete foundations, built originally as barracks Nos. 2 and 3 for the S. A. T. C.

POWER AND WATER SYSTEMS. The College maintains and operates its own modern heat, light, power, water and sewer systems. A central boiler plant of 2,400 horsepower furnishes steam for both the heating system and the power plant. The central power plant contains steam engines and turbines, totaling 700 horsepower, connected to electric generators which furnish power and light for the entire campus. A complete system of underground tunnels connects the various buildings

and through these are carried the steam mains and electric cables which distribute steam and electrical energy to the different parts of the campus.

The waterworks pump house contains electric motor-driven pumps of an aggregate capacity of 600 gallons per minute. Cast-iron water mains distribute this over the campus, and a steel tank of 110,000 gallons capacity supported on a steel tower provides a reserve supply.

Value of the equipment in connection with the power and water systems amounts to \$118,399. In addition to this and other totals for equipment listed above, there are other items which might be mentioned, *e. g.*, live stock valued at \$106,578.

The College Library

The general College Library consists of all books belonging to the College, including the library of the Experiment Station, which is incorporated with it. On January 1, 1921, the Library contained 68,469 bound volumes, besides much unbound material. It receives currently about four hundred serial publications. As a depository the Library receives the documents and other publications of the United States government. The books are classified according to the Dewey system and are indexed in a dictionary card catalogue.

All students, as well as all officers of administration and instruction, have the privilege of direct access to the book stacks. The Library is primarily for free reference use, but the privilege of drawing books is accorded to all those connected with the College as registered students or as members of the Faculty. Books not specially reserved may be drawn for home use for two weeks. All books are subject to recall at any time.

General reference books, books reserved for classes, general periodicals, and certain other groups of books are to be consulted only in the reading rooms. They may not be loaned from the Library except when the reading rooms are closed. They must then be returned to the Library by the time it next reopens. Any violation of the regulations of the Library subjects the offender to a fine, or to a withdrawal of library privileges, or to both, according to the gravity of the offense. More serious offenses, such as mutilation or theft of books or periodicals, are considered just causes for suspension or expulsion of the offender, who is also required to make good the loss incurred.

READING ROOMS. Three reading rooms are maintained in connection with the Library; the general reference room, containing encyclopedias, dictionaries, atlases, bibliographies, and general reference books; the special reference room, containing books reserved for classes; and the periodical room, containing current magazines and the important daily and weekly Kansas newspapers. These rooms are freely open to the students and to the public for purposes of reading and study.

DIVISIONAL LIBRARIES. Divisional and departmental collections are deposited in certain College buildings apart from the main Library. These collections are for the special convenience of the instructors and students of the departments concerned. They are under the direction of the Librarian and are accessible to all students at regular hours.

Requirements for Admission

The entrance requirements to the College are made broad and flexible, only fundamental subjects being definitely required. These requirements are made upon the supposition that high schools are local institutions in which the courses should be adapted to the needs of the individual localities, and that college entrance requirements should be such as to take the output of the high schools, rather than to determine the nature of the work offered in them.

Any person who has completed a four-year course of study in any high school or academy accredited by the State Board of Education will be admitted to the freshman class.

In order to carry the several curricula successfully the following subjects must have been completed:

| | |
|---|--|
| Curriculum in Agriculture..... | English, three units; physics, one unit; algebra, one unit; geometry, one unit |
| Curriculum in Veterinary Medicine... | Same as above |
| Curriculum in Animal Husbandry and Veterinary Medicine | Same as above |
| Curriculum in Industrial Journalism.. | Same as above |
| Curriculum in Home Economics..... | Same as above |
| Curriculum in General Science..... | English, three units; physics, one unit; algebra, one and one-half units; geometry, one unit |
| Curricula in Agricultural Chemistry, Industrial Chemistry, and Biochemistry | Same as above |
| Curricula in Engineering..... | English, three units; physics, one unit; algebra, one and one-half units; geometry, one and one-half units |
| Curriculum in Architecture..... | Same as above |

These curricula were formulated on the assumption that the high-school subjects named will be offered for admission. Those graduates of accredited high schools who in accordance with a state law are admitted as freshmen without all of the high-school subjects that are prerequisite to carrying the curricula chosen will be assigned to the necessary subjects and allowed college credit toward graduation in them, as follows: Elementary physics, four semester hours; algebra III, two semester hours; solid geometry, two semester hours.

Persons who are not graduates of accredited high schools or academies will be admitted to the freshman class if they have completed fifteen acceptable units of high-school work. (A unit is defined to be the work in an accredited high school or academy in five recitation periods a week for one school year.) One who offers fourteen such units will be admitted as a freshman, but will be conditioned in one unit. Such deficiency must be made up the first year that the student is in attendance. If not made up within that time College credits are taken in its place.

Subjects acceptable for entrance, arranged in eight groups, together with the number of units that may be offered, are shown as follows:

| | |
|---|--|
| GROUP I English | Three or four units |
| GROUP II Foreign Languages | Latin, one, two, three, or four units Greek, one, two, three, or four units German, one, two, three, or four units French, one, two, three, or four units Spanish, one, two, three, or four units |
| GROUP III Mathematics | Elementary algebra, one or one and one-half units Plane geometry, one unit Solid geometry, one-half unit Plane trigonometry, one-half unit Advanced algebra, one-half unit |
| GROUP IV Natural Sciences | Physical geography, one-half or one unit *Physics, one unit *Chemistry, one unit *Botany, one-half or one unit *Zoölogy, one-half or one unit *Physiology, one-half or one unit *General biology, one-half or one unit *General science, one-half or one unit |
| GROUP V History and Social Sciences | Greek and Roman history, one unit Medieval and modern history, one unit English history, one unit American history, one unit Economics, one-half or one unit Sociology, one-half unit Civics, one-half or one unit |
| GROUP VI Normal Train- ing Subjects | Psychology, one-half unit Methods and management, one-half unit Higher arithmetic, one-half unit Reviews <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> Grammar, twelve weeks Geography, twelve weeks Reading, twelve weeks </div> <div style="font-size: 3em; margin-right: 10px;">}</div> <div>one unit</div> </div> *Music, one unit |
| GROUP VII Industrial Subjects | *Agriculture, one-half, one, two, three, or four units *Drawing, one-half or one unit *Woodwork, one-half, one, or two units *Forging, one-half or one unit *Domestic science, one-half, one, or two units *Domestic art, one-half, one, or two units |
| GROUP VIII Commercial Subjects | Commercial law, one-half unit Commercial geography, one-half unit Bookkeeping, one-half or one unit *Stenography and typewriting, one-half or one unit |

DEFICIENCIES

The courses in the School of Agriculture offered in connection with the College give every needed opportunity for students of the College to make up anything lacking in their preparation for entrance. All such entrance deficiencies must be made up before the beginning of the sophomore year. No student is considered a candidate for graduation in

* In courses consisting of laboratory work wholly or in part, two periods of laboratory work are to be considered the equivalent of one recitation period.

the spring who is deficient more than nine semester hours in addition to his regular assignment at the beginning of the first semester. No student who fails or is conditioned or found deficient in any subject, or whose grade in more than one subject falls below G in any semester, is allowed to carry extra work during the succeeding semester.

ADVANCED CREDIT

At the discretion of the President, students who present certificates showing credits for college work done in other institutions are allowed hour-for-hour credit on courses in this College in so far as they may be directly applied, or can be accepted as substitutions or electives. Candidates must present to the Committee on Advanced Standing their high-school and college credits certified to by the proper authorities. It is requested, also, that a college catalogue covering the period of attendance be furnished with the above credentials. In cases in which it is impossible for one to furnish an acceptable certificate concerning work upon which advanced credit is asked, examinations are given, if the subject has been studied under competent instruction.

ADMISSION

ADMISSION BY EXAMINATION. Examinations for admission will be held at the College on Monday, September 12, 1921; Tuesday, January 31, 1922; and Friday, June 2, 1922.

ADMISSION BY CERTIFICATE. The applicant is required to submit to the Committee on Admission a certificate of the high-school or academy credit properly certified to by the authorities of the institution in which the work was done. Blanks will be furnished by the College for this purpose.

It is greatly to the advantage of the prospective student to see to it that this blank, properly filled out and *indicating the course he wishes to take here*, be sent to the College as soon as possible after graduation. A permit to register will then be sent him by the Registrar before the first of September. This permit *cannot be sent* unless the prospective student sees that the information as to course is sent to the Registrar. This will greatly facilitate the work of entrance. The student will present this permit at the registration room in Nichols Gymnasium, and will not be compelled to wait for his turn to meet the Committee on Admission.

LATE REGISTRATION

A considerable amount of extra work and a great deal of confusion is caused by the neglect of students to enroll at the time set for that purpose, and a fee of \$1 will be charged those who enroll after the time fixed for the close of registration unless they present a good excuse for their delay.

SPECIAL STUDENTS

In recognition of the fact that experience and maturity tend to compensate, in a measure at least, for lack of scholastic attainment, the College admits as special students those who are twenty-one years of age or older, without requiring them to pass the regular examinations,

provided (1) they show good reason for not taking a regular course; (2) they be assigned only to such work as they are qualified to carry successfully; (3) they do superior work in the subjects assigned. The age limit is not applied to special students of music.

A special student is assigned by the dean of the division in which occur the major subjects to be pursued.

KANSAS HIGH SCHOOLS AND ACADEMIES IN ACCREDITED RELATIONS WITH THE COLLEGE

(Graduates admitted without examination.)

| | | |
|--------------------------|--------------------|---------------------------|
| Abbyville | Benedict | Coffeyville |
| Abilene | Bennington | Colby |
| Ada | Bentley | (Thomas County) |
| Adams | Benton | Coldwater |
| Admire | Bern | Colony |
| Agenda | Berryton | Columbus |
| Agra | Beverly | (Cherokee County) |
| Alden | Bird City | Concordia |
| Alexander | Blue Mound | (Concordia High School) |
| Allen | Blue Rapids | (Nazareth Academy) |
| Alma | Bonner Springs | Conway Springs |
| Almena | Bronson | Copeland |
| Altamont | Brookville | Corning |
| (Labette County) | Brownell | Cottonwood Falls |
| Alta Vista | Bucklin | (Chase County) |
| Alton | Bucyrus | Council Grove |
| Altoona | Buffalo | Courtland |
| Americus | Buhler | Covert |
| Andover | Bunkerhill | Cuba |
| Anthony | Burden | Cullison |
| (Anthony High School) | Burlingame | Culver |
| (Spring Township H. S.) | Burlington | Cunningham |
| Arcadia | Burns | Deerfield |
| Argonia | Burr Oak | Delia |
| Arkansas City | Burrton | Delphos |
| Arlington | Bushong | Denison |
| Arma | Bushton | Denton |
| Asherville | Byers | Derby |
| Ashland | Caldwell | De Soto |
| Assaria | Caney | Dexter |
| Atchison | Canton | Dighton |
| (Atchison High School) | Carbondale | (Lane County) |
| (Mount Saint Scholastica | Carlyle | Dodge City |
| Academy) | Cassoday | (Dodge City High School) |
| Athens | Cawker City | (Saint Mary of the Plains |
| Athol | Cedar | Academy) |
| Atlanta | Cedar Vale | Dorrance |
| Attica | Centralia | Douglass |
| Atwood | Chanute | Downs |
| (Rawlins County) | Chapman | Dunlap |
| Auburn | (Dickinson County) | Easton |
| Augusta | Chase | Edna |
| Aurora | Cheney | Edwardsville |
| Axtell | Cherokee | Effingham |
| Baldwin | (Crawford County) | (Atchison County) |
| Bancroft | Cherryvale | El Dorado |
| Barclay | Chetopa | Elk City |
| Barnard | Cimarron | Elkhart |
| Barnes | Circleville | Ellinwood |
| Basehor | Clafin | Ellis |
| Bavaria | Clay Center | Ellsworth |
| Baxter Springs | (Clay County) | Elmdale |
| Bazine | Clayton | Elsmore |
| Beattie | Clearwater | Elwood |
| Belleville | Cleburne | Emporia |
| Belle Plaine | Clifton | (Emporia High School) |
| Beloit | Climax | (Normal High School) |
| Belpre | Clyde | Englewood |
| Belvue | Coats | Enterprise |
| Bendena | Codell | Erie |

| | | |
|-------------------------|---------------------------|-----------------------------|
| Esbon | Hoxie | Louisville |
| Eskridge | Hoyt | Lovewell |
| Eudora | Hugoton | Lucas |
| Eureka | (Stevens County) | Luray |
| Everest | Humboldt | Lyndon |
| Fairview | Hunter | Lyons |
| Fall River | Hutchinson | Macksville |
| Falun | Independence | Madison |
| Fellsburg | (Montgomery County) | Mahaska |
| Florence | Ingalls | Maize |
| Ford | Inman | Manhattan |
| Formoso | Iola | (Manhattan High School) |
| Fort Scott | Ionia | (Sacred Heart Academy) |
| Fowler | Irving | Mankato |
| Frankfort | Isabel | Maplehill |
| Frontenac | Jamestown | Marion |
| Fredonia | Jarbalo | Marquette |
| Fulton | Jetmore | Marysville |
| Galena | (Hodgeman County) | Mayetta |
| Galesburg | Jewell | McCracken |
| Galva | Johnson | McCune |
| Garden City | (Stanton County) | McDonald |
| Garden Plain | Junction City | McLouth |
| Gardner | Kanopolis | McPherson |
| Garfield | Kansas City | (McPherson High School) |
| Garnett | (Argentine High School) | (Central College Academy) |
| Garrison | (Catholic High School) | (McPherson College Academy) |
| Gaylord | (Central High School) | |
| Geneseo | (Sumner High School) | |
| Girard | (Wilson High School) | |
| Glasco | Keats | Meade |
| Glen Elder | Kensington | Medicine Lodge |
| Goddard | Kincaid | Melvorn |
| Goff | Kingman | Meriden |
| Goodland | Kinsley | Merriam |
| (Sherman County) | Kiowa | Michigan Valley |
| Great Bend | Kipp | Milan |
| Greeley | Kirwin | Mildred |
| Greenleaf | La Crosse | Milton |
| Greensburg | La Cygne | Miltonvale |
| (Kiowa County) | La Harpe | (Miltonvale High School) |
| Grenola | Lakin | (Wesleyan Academy) |
| Gridley | Lane | Minneapolis |
| Grinnell | Langdon | Minneola |
| Gypsum | Lansing | Moline |
| Haddam | Larned | Montezuma |
| Halstead | Latham | Monument |
| Hamilton | Lawrence | Moran |
| Hamlin | (Lawrence High School) | Morehead |
| Hanover | (Oread High School) | Morganville |
| Hardtner | Leavenworth | Morland |
| Harlan | (Catholic High School) | Morrill |
| Harper | (Leavenworth H. S.) | Mound City |
| (Harper High School) | (St. Mary's Academy) | Mound Ridge |
| (Harper Academy) | | Mound Valley |
| Hartford | Lebanon | Mount Hope |
| Harveyville | Lebo | Mulberry |
| Haven | Lecompton | Mullinville |
| Havensville | Lenora | Mulvane |
| Haviland | Leon | Munden |
| (Haviland High School) | Leonardville | Narka |
| (Haviland Academy) | Leoti | Natoma |
| Hays | (Wichita County) | Neal |
| Hazelton | Le Roy | Neodesha |
| Herington | Lewis | Neosho Falls |
| Herndon | Liberal | Neosho Rapids |
| Hesston | Lincoln | Ness City |
| (Hesston Academy) | Lincolnville | Netawaka |
| Hiawatha | Lindsborg | Newton |
| Highland | (Lindsborg High School) | (Newton High School) |
| Hill City | (Bethany College Academy) | (Bethel College Academy) |
| Hillsboro | Linn | New Ulysses |
| (Hillsboro High School) | Linwood | (Grant County) |
| (Tabor College Academy) | Little River | Nickerson |
| Hoisington | Logan | (Reno County) |
| Holecomb | Longford | Norcatour |
| Holton | Long Island | Northbranch |
| Hope | Longton | (Northbranch Academy) |
| Horton | Lost Springs | Norton |
| Howard | Louisburg | (Norton County) |
| | | Nortonville |
| | | Norway |

| | | |
|----------------------|--------------------------|----------------------------|
| Norwich | Robinson | Topeka |
| Oakland | Rock Creek | (Topeka High School) |
| Oakley | Rosalia | (Catholic High School) |
| Oberlin | Rosedale | (College of the Sisters of |
| (Decatur County) | Rose Hill | Bethany) |
| Offerle | Rossville | (Highland Park High |
| Oketo | Roxbury | School) |
| Olathe | Rozel | (Washburn Rural High |
| Olsburg | Russell | School) |
| Onaga | Russell Springs | Toronto |
| Oneida | Sabetha | Towanda |
| Osage City | Saffordville | Tribune |
| Osawatimie | Saint Francis | (Greeley County) |
| Osborne | (Cheyenne County) | Trousdale |
| Oskaloosa | Saint George | Troy |
| Oswego | Saint John | Turner |
| Ottawa | (Saint John High School) | Turon |
| (Ottawa High School) | (Antrim High School) | Udall |
| (University Academy) | Saint Marys | Uniontown |
| Overbrook | (Saint Marys High | Utica |
| Overland Park | School) | Valley Center |
| Oxford | (Immaculate Conception | Valley Falls |
| Ozawkie | High School) | Vermillion |
| Padonia | Salina | Vernon |
| Palco | (Salina High School) | Vesper |
| Paola | (Sacred Heart Academy) | Vinland |
| (Paola High School) | (Saint John's Military | Viola |
| (Ursuline Academy) | Academy) | Virgil |
| Paradise | Santa Fe | Wa Keeney |
| Parkerville | (Haskell County) | (Trego County) |
| Parsons | Savonburg | Wakefield |
| Partridge | Sawyer | Waldo |
| Pawnee Rock | Scandia | Walnut |
| Paxico | Scott City | Walton |
| Peabody | (Scott County) | Wamego |
| Perry | Scottsville | Washington |
| Piedmont | Scranton | Waterville |
| Phillipsburg | Sedan | Wathena |
| Pittsburg | Sedgwick | Waverly |
| Plainville | Seneca | Webster |
| Plains | (Seneca High School) | Welda |
| Pleasanton | (Saint Peter and Paul's) | Wellington |
| Plevna | Severance | (Sumner County) |
| Pomona | Severy | Wellsville |
| Portis | Sharon | Westmoreland |
| Potter | Sharon Springs | Westphalia |
| Potwin | Silver Lake | Wetmore |
| Powhattan | Simpson | Wheaton |
| Pratt | Smith Center | White City |
| Preston | Soldier | White Cloud |
| Pretty Prairie | Solomon | White Water |
| Princeton | South Haven | Whiting |
| Protection | Sparks | Wichita |
| Quenemo | Spearville | (Wichita High School) |
| Quindaro | Spivey | (Cathedral High School) |
| (Western University | Spring Hill | (Friends University |
| Academy) | Stafford | Academy) |
| Quinter | Stark | (Mount Carmel Academy) |
| Ramona | Sterling | Williamsburg |
| Randall | Stilwell | Willis |
| Randolph | Stockton | Wilmore |
| Ransom | Sublette | Wilsey |
| Rantoul | Summerfield | Wilson |
| Reading | Sylvan Grove | Winchester |
| Redfield | Sylvia | Windom |
| Reece | Syracuse | Winfield |
| Republic | Tampa | Winona |
| Reserve | Tescott | Woodbine |
| Richmond | Thayer | Woodston |
| Riley | Tonganoxie | Yates Center |

Undergraduate Degrees and Certificates

For graduation, one must complete one of the four-year curricula as shown elsewhere. These are believed to provide for the necessities of most students who seek an institution of this kind, and departures from the specified work are not encouraged. Under special conditions, however, such College substitutions are allowed as the interests of the student demand. The total requirement, including military science or physical training, is about 134 hours, or semester credits, a semester credit being one hour of recitation or lecture work, or three hours of laboratory work a week, for one semester of eighteen weeks. A student, to be considered as a candidate for graduation, must have done his last year's work in residence. In special cases, candidates would be considered who have done three full years of work here and have done their last in an institution approved by the Faculty.

Candidates for graduation or for advanced degrees are requested to be present in person, unless arrangements have been made in advance for the conferring of the degree in absentia. Application for this privilege should be made to the student's dean.

DEGREES

The degree of Bachelor of Science (B. S.) is conferred upon those who have completed the four-year curriculum in agriculture, agricultural engineering, mechanical engineering, electrical engineering, civil engineering, flour-mill engineering, architecture, home economics, industrial journalism, agricultural chemistry, bio-chemistry, industrial chemistry, or general science.

The degree of Bachelor of Music (B. M.) is conferred upon those who have completed the four-year curriculum in music.

The degree of Doctor of Veterinary Medicine (D. V. M.) is conferred upon those who have completed the four-year curriculum in veterinary medicine.

CERTIFICATES

An appropriate certificate is granted upon completion of any one of the following:

1. The three-year curriculum in music.
2. The first two years of the four-year course in agriculture.
3. The short course in agriculture.
4. The two-year curriculum in public-school music.
5. The one-year course in lunch-room management.
6. The housekeepers' course, lasting about fifteen weeks.
7. The eight-week creamery short course.
8. Any one of the special courses related to engineering.

Graduate Study

THE ADMINISTRATION OF GRADUATE COURSES

The administration of the graduate courses is vested in the Graduate Council. This body consists of seven members, selected from the different divisions of the College as follows: Agriculture, two; Engineering, one; General Science, two; Home Economics, one; and Veterinary Medicine, one. The members of the Graduate Council are appointed and its chairman designated by the President.

Graduate courses may be offered by members of the Graduate Faculty only. The Graduate Faculty consists of all those recommended by the department heads and approved by the Graduate Council as qualified to give graduate instruction. Its chairman is the chairman of the Graduate Council.

The Graduate Council determines, subject to the authority of the President and the Board of Administration, and in accordance with any general regulations adopted by the Graduate Faculty, matters of curriculum, admission to graduate study and to candidacy to advanced degree, and other matters which relate to the proper administration and development of graduate work in the College.

ADMISSION

Admission to graduate courses is granted to graduates of institutions whose requirements for the bachelor's degree are substantially equivalent to those of the Kansas State Agricultural College. Admission to the graduate courses, however, may not be construed to imply admission to candidacy for an advanced degree. Such candidacy is determined by the Graduate Council upon the recommendation of the major instructor after the student has demonstrated by his work for a period of two months or longer that he has the ability to do major work of graduate grade. A mere accumulation of grades will not lead to a degree.

Three classes of applicants are recognized: (1) those who have received a bachelor's degree and wish to broaden their education without reference to an advanced degree; (2) those who wish to become candidates for advanced degrees, but are deficient in undergraduate preparation; and (3) those who wish to become candidates for an advanced degree and whose preparation is adequate.

Applicants of Class 1 are admitted at once, on evidence of graduation, to approved graduate courses. Those of Class 2 are admitted to graduate standing, but must at once make up their deficiencies by taking the necessary work in the undergraduate courses or by arrangement with the head of the department involved. Upon making up all deficiencies, Class 2 applicants are recognized as of Class 3. The latter are admitted to candidacy as previously provided.

Application blanks for admission to graduate courses may be secured from the Registrar. Every applicant for admission must submit with his application an official transcript of his college record.

Students applying for graduate work should present themselves to the chairman of the Graduate Council, after registering at Nichols Gymnasium, for instructions concerning assignment to classes. On regular registration days (see College Calendar), the chairman will be found at Nichols Gymnasium, on other days in Room 38, Waters Hall.

REGISTRATION

Students who have been admitted to the graduate courses are required to register with the College Registrar and with the chairman of the Graduate Council, at the beginning of each semester, unless special permission for later registration has been granted by the chairman of the Graduate Council. Credit toward the fulfillment of the residence requirements dates from the time of registration and not from the beginning of the semester when the student enters.

CANDIDACY FOR MASTER'S DEGREE

Candidates for the degree of Master of Science (M. S.) are required to spend at least one collegiate year in residence, except under the special conditions noted below. The equivalent of thirty-two semester credits including a thesis must be satisfactorily completed. Not more than sixteen credits, including thesis, may be secured in a single semester. Students holding half-time graduate assistantships may not obtain more than eight credits, including thesis, in one semester.

GRADES. Graduate students' work is graded in five classes: E, G, M, P, and F. The last indicates a failure. P indicates unsatisfactory though passable work. The degree will not be conferred on any student who does not receive a grade of G or higher in three-fourths of the courses taken, including thesis. A failure or absence from examination in any course may prevent the conferring of the degree, and failure in any course in the major field precludes conferring the degree in the same year.

LANGUAGE REQUIREMENTS. A reading knowledge of a modern language in the field of the major subject is highly desirable. At the discretion of the department in which the major work is done, this may be required for the degree. This requirement must be met before the beginning of the last semester preceding the conferring of the degree by the student's presenting himself to the head of the Department of Modern Languages for examination. An earlier meeting of this requirement is highly desirable.

MASTER'S THESIS. Each candidate for a master's degree is required to present a thesis on some subject approved by the Graduate Council upon the recommendation of the instructor in charge of his major work.

The thesis ordinarily demands one-fourth of the student's time and may not exceed one-third of it. The thesis must be typewritten according to the specifications to be obtained from the office of the chairman of the Graduate Council.

Under proper conditions, a student of unusual attainment may be allowed to complete *in absentia* the last fourth of his work if this is

devoted to his thesis. To secure this privilege, the student must have spent the equivalent of one semester and a half in residence and have creditably passed not less than twenty-four credits of graduate work; must petition for the privilege; must submit to the chairman of the Graduate Council an outline of his proposed investigation, approved by the head of his major department; and must submit satisfactory evidence that adequate facilities are available to him at the place where he proposes to do the work.

A preliminary report on the progress of all theses must be made by the major instructors to the chairman of the Graduate Council before April 1 of the year when the degree is conferred. Three complete copies of the theses as approved must be furnished not later than May 15 to the chairman of the Graduate Council. One of these copies will be deposited in the College Library, one with the dean of the division involved, and the other placed on file in the department in which the major subject is taken.

A candidate for the master's degree is subject to a rigid oral examination covering his major and minor subjects and thesis by a committee consisting of the dean of the division in which his major subject was taken, the member of the Graduate Council from that division, and the instructors with whom he has taken major and minor work.

PROGRAM OF STUDY

In carrying graduate work, the student is expected to assume the initiative and the responsibility. It is important to recognize in the beginning that graduate work does not consist in the fulfillment of routine requirements alone. The various courses as well as the assistance and advice of the instructors are to be regarded simply as aids in acquiring the methods, discipline, and spirit of independent research.

Each candidate for a degree is expected to have a wide knowledge of his subject and of related lines of work. This is usually obtained only by a wide range of private reading and study outside the immediate field covered by the formal courses to which he may be assigned.

The branch of knowledge to which the student expects to devote the larger part of his time is termed his major subject. The other fields of study selected, which will necessarily be more restricted in scope, are termed minor subjects. The latter should be chosen with reference to their direct bearing on the major subject.

Approximately two-thirds of a student's time is devoted to his major subject and one-third to one or more minor subjects. The word subject is used to designate a recognized field of study, and is not defined by the limits of a department. The nature and distribution of the majors and minors are approved by the Graduate Council, upon the recommendation of the instructor with whom the major is taken.

The program of study suggested by the major instructor and approved by the Graduate Council is made the basis of the formal assignment to courses at the beginning of each semester and of the summer session.

It will be noted that in the announcements of the various departments of the College that certain courses are open to both graduate and under-

graduate students. No credit earned during the undergraduate course may be counted for graduate credit, unless registered, at the time taken, with the chairman of the Graduate Council as credits in excess of those required for the bachelor's degree.

GRADUATE ASSISTANTSHIPS

In order to encourage graduates of this and similar institutions to continue their studies and to pursue advanced work leading to a master's degree, the College has established graduate assistantships in several departments. These assistantships demand half the time of the student for laboratory or research assistance along the line of his major work. The remainder of his time is given to graduate work. No graduate assistant may receive more than eight graduate credits per semester nor satisfy the residence requirement in less than two years.

Graduate assistantships paying a salary fixed each year by the Board of Administration have been established as follows:

| <i>Subject</i> | <i>Number</i> | <i>Date vacant</i> |
|------------------------------------|---------------|--------------------|
| Animal Husbandry | 2 | September, 1921 |
| Bacteriology | 1 | September, 1921 |
| Crops | 1 | September, 1921 |
| Dairy Husbandry | 1 | September, 1921 |
| Food Economics and Nutrition | 1 | September, 1921 |
| Household Economics | 1 | September, 1921 |
| Plant Pathology | 1 | September, 1921 |
| Poultry Husbandry | 1 | September, 1921 |
| Soils | 1 | September, 1921 |
| Steam and Gas Engineering | 1 | September, 1921 |
| Zoölogy | 1 | September, 1921 |

Appointments for all assistantships are made annually in March or soon thereafter for the following year. Students desiring such appointments may obtain application blanks from the chairman of the Graduate Council.

GRADUATE WORK IN THE SUMMER SESSION

Graduate students desiring to do a part or all of the work for the master's degree in the summer may complete the residence requirements by pursuing graduate work for four summer sessions. In special cases it may be possible to complete the residence requirements for the master's degree as indicated above under Candidacy for Advanced Degree.

A detailed announcement concerning the graduate work in the Summer School may be had on application to the Dean of the Summer School, Kansas State Agricultural College, Manhattan, Kan.

Professional Degrees

ENGINEERING AND ARCHITECTURE

Graduates in engineering or in architecture from this College previous to 1917 who have been engaged in engineering or architectural practice for a period of five years or more, and graduates in 1917 or later who have been engaged in engineering or architectural practice for a period of three years or more, will be granted the professional degrees of M. E., C. E., E. E., Agr. E., F. M. E., or Architect, under the following conditions:

The graduate to be eligible to a degree must submit a statement of his experience and a thesis covering some phase of his practice. This thesis and experience must be approved by the head of the department in which the degree is requested, by the Dean of the Division of Engineering, and by the Graduate Council, before the granting of such a degree will be recommended to the College Faculty and to the Board of Administration.

General Information

DUTIES AND PRIVILEGES

Good conduct in general, such as becomes men and women everywhere, is expected of all students. Every possible aid and stimulus toward the development of good character is given by the various Christian organizations of the College and the town and by the College itself. Every student is expected to render a good account of himself in the College community life. For those who are highminded and reasonable, no other requirements need be expected. College discipline is confined chiefly to sending away those whose conduct, after fair trial, makes their further attendance at the College unprofitable or inadvisable.

In order that a fine type of democratic sociability may be fostered among students and Faculty a large community recreation and rest center has been recently established (1920) in Anderson hall, the administrative building. This center, one of the largest rooms on the campus, is furnished with divans, arm chairs, and writing tables in wicker and is neatly and beautifully decorated. During vacant hours and between classes students and Faculty gather here for rest and conversation. The room is also available for student and Faculty receptions and parties during the late afternoon and the evening hours.

Absences from class or laboratory periods must be accounted for to the instructor concerned. Permission for absence from College for one or more days must be secured in advance from the dean of the division in which the student is registered. Students cannot honorably leave the College before the close of a semester, except by previous arrangement with the deans concerned.

Opportunities for general scientific, literary and forensic training are afforded, in addition to the College courses, by various literary and scientific societies and clubs. The Science Club, meeting monthly, admits to membership all instructors and students interested in science. Papers given at the meetings of the Science Club represent original work in science done at the institution. The program is further characterized by free discussion of the papers presented and by general scientific notes and news contributed by the members. The numerous literary and professional societies, which are described elsewhere in the catalogue under the title "Student Organizations," also afford excellent training in their diverse lines.

At various times during the year the College halls are opened for social, literary, musical, and dramatic entertainments furnished by lecture courses, by the literary societies, by the Department of Music, by the Dramatic Club, by the Oratorical Association, and by other organizations of students and instructors. Addresses by prominent speakers, men of affairs, and persons prominent in scientific, educational, and social work are of frequent occurrence.

EXPENSES

TUITION. There is no charge for tuition. Class instruction in music is free, but fees are charged for individual instruction. (See Department of Music for statement of fees for music.)

MATRICULATION FEE. A matriculation or entrance fee of \$10 for residents of Kansas, or \$15 for nonresidents, is charged all students in College curricula and in the School of Agriculture. This fee is not charged Summer School students or short course students, but it is payable by special students in the College or the School of Agriculture.

INCIDENTAL FEE. An incidental fee of \$20 a year or \$10 a summer term is charged residents of Kansas; nonresidents pay \$30 a year or \$15 a summer term. Students in short courses of more than eight weeks duration pay an incidental fee of \$10. Eight-week short-course students pay an incidental fee of \$5.

SICK-BENEFIT FEE. Each student in the College or School of Agriculture pays a sick-benefit fee of \$3 a year or \$1.50 for a summer term. Students in short courses of more than eight weeks duration pay a sick-benefit fee of \$1.50. For students in the short courses, lasting eight weeks only, this fee is \$1.

The sick-benefit fee entitles the student to receive the service of the College physician for any illness contracted while in College. The fee does not include the cost of medicine, surgical operations, reduction of fractures, hospital fees, or the treatment of chronic conditions. As far as possible, and provided the students requesting such services live within the city limits, the College physician visits in their rooms students who are too ill to go to the physician's office.

The College maintains on the campus a contagion hospital having separate wards for men and women. This hospital is in charge of a matron who resides continuously in the building and cares for the patients under the direction of the College physician. Students, when suffering from or suspected of having any contagious disease, except smallpox, are admitted to the hospital on the recommendation of the College physician. The student's only expense for hospital service is a fixed charge of \$1.50 a day. The aim of the College in providing this hospital is to prevent contagious diseases among the students and, in case the student should contract such a disease, to make it unnecessary to quarantine a rooming house where there are many students.

LATE REGISTRATION FEE. For unexcused late registration the student is charged \$1.

LABORATORY EXPENSE. In all laboratories students are required to pay for supplies used and for apparatus broken or lost. The cost in the several subjects ranges from 50 cents to \$7.50 a semester. In the special courses related to engineering, the laboratory charges are fixed at from \$18 to \$36 for the entire course.

COMMENCEMENT FEE. On graduation students pay a commencement fee of \$10 to cover the cost of the diploma and other commencement expenses.

WHEN FEES ARE PAYABLE. All fees of \$30 or less are payable at the beginning of each year, but in case of withdrawal not later than the beginning of the second semester a refund is payable to the student. All fees over \$30 are payable in two equal installments at the beginning of each semester.

TEXTBOOKS. The average cost of textbooks is about \$8 a semester in most of the curricula. For the first semester the cost is about \$12. There is considerable variation from term to term and in the different curricula.

GYMNASIUM SUITS. Each young woman taking physical training must have an approved gymnasium suit costing about \$4.50. Complete gymnasium suits for young men cost about \$5.

MILITARY UNIFORM. Each student required to take military training must deposit \$15 for his uniform, which will be furnished by the College. From this sum, \$1 per semester or part thereof will be deducted as a fee for military training. The balance of this deposit will be returned to the student upon the return of the complete uniform. Losses of parts of the uniform must be paid for by the student.

ROOMS. Rooms are not furnished by the College. They are readily obtainable in the city at a cost of from \$10 to \$15 a month for a room suitable for two occupants. Less desirable quarters and less desirable locations may be obtained at a lower rate. There are great differences in the accommodations offered. Those for which the higher prices are charged are modern in all respects, and light, heat, and bath are included in the cost stated.

BOARD. The cost of board depends largely upon individual requirements. In clubs and private boarding houses the cost is usually from \$5 to \$7 a week. Students may board themselves at a smaller money outlay. The College operates a first-class cafeteria, where all meals may be obtained, except on Sundays, at moderate prices. Food is furnished at cost and the expense to the student depends upon the care and judgment which he employs. The College also operates a mess-hall where meals are served every day in the week at thirty cents each. This is especially convenient for men in the special courses related to engineering.

LAUNDRY. The expense for laundry may be estimated at 40 cents to 70 cents a week, depending upon individual requirements.

BOARDING AND ROOMING HOUSES

The Christian Associations of the Agricultural College keep on file the official list of boarding and rooming houses. All correspondence relative to boarding accommodations, in advance of the student's arrival in Manhattan, may be addressed to the secretary of the Young Men's Christian Association, to the secretary of the Young Women's Christian Association, or to the Registrar of the College. Upon arrival in Manhattan, young men should go directly to the Y. M. C. A. building, corner of Eleventh and Fremont streets, or to the office of the Y. M. C. A. secretary, in Anderson Hall on the College campus. Young women upon arrival should go directly to the Y. W. C. A. offices in Home Economics Hall on the campus. The cars from the Union Pacific station pass directly by the Y. M. C. A. building. Jitney service may be had from either station.

For three days before the opening of the fall semester and for the first three days after the opening day, committees from these associations meet trains and assist in directing new students, either to the association buildings or directly to proper boarding places. The associations make no charge for their services or for lists of all approved boarding places, and new students should depend absolutely upon the recommendations of the association committees.

SELF-SUPPORT

The courses of instruction are based upon the supposition that the student is here for study, and therefore a proper grasp of the subjects cannot be obtained by the average student unless the greater part of his time is given to College work. Students of limited means are encouraged and aided in every possible way, but unless exceptionally strong, both mentally and physically, such students are advised to take lighter work by extending their courses, in case they are obliged to give any considerable time to self-support. As a rule, a student should be prepared with means for at least a semester, as some time is required in which to make acquaintances and to learn where suitable work may be obtained.

There are various lines in which students may find employment. The College itself employs labor to the extent of about \$1,200 a month, at rates varying from 20 to 35 cents an hour, according to the nature of the employment and the experience of the employee. Most of this labor is upon the College farm, in the orchards and gardens, in the shops and the printing office, for the janitor, etc. Various departments utilize student help to a considerable extent during the vacations. Students demonstrating exceptional efficiency, ability, and trustworthiness obtain limited employment in special duties about the College. Many students secure employment in various lines in the town, and some opportunity exists for obtaining board in exchange for work, with families either in town or in the neighboring country.

Labor is universally respected in the College community, and the student who remains under the necessity of earning his way will find himself absolutely unhampered by discouraging social conditions. Indeed, over one-third of the students support themselves wholly, while a third support themselves in part. False standards regarding physical work do not exist, and are not tolerated by the board of instruction or by the student body as a whole. Absolutely democratic standards prevail at the College, and students are judged on the basis of their personal worth and efficiency alone.

Students are assisted to obtain employment by means of the employment bureaus maintained by the Young Men's Christian Association and by the Young Women's Christian Association of the College, with secretaries of which organizations correspondence is encouraged.

STUDENT LOAN FUNDS

THE ALUMNI LOAN FUND. The Alumni Association of the Kansas State Agricultural College has created a loan fund, chiefly by means of payments by which the alumnus is relieved from further regular dues in the association. Members are due to pay the association \$1 a year, and

on payment of \$20 in one sum they are relieved from such dues. The fund so created is lent to students at 5 per cent per annum. The fund is administered by a committee appointed by the directors of the Alumni Association. The committee announces no specific rules governing the granting of loans, but in general gives preference to smaller amounts on short time over larger amounts which cannot be paid for several years. Alumni are urged to add to the funds thus made available to worthy students. Students wishing loans from this fund may address Dean J. T. Willard, chairman of the Alumni Loan Fund Committee, Manhattan, Kan.

THE HENRY JACKSON WATERS LOAN FUND. The Henry Jackson Waters loan fund consists of the royalties received from the Kansas sales of Ex-President Waters' textbook, *The Essentials of Agriculture*. The royalties so far have amounted to more than \$1,000, which sum has been augmented by gifts of \$100 each from Senator Capper and L. R. Eakin, of Manhattan, and by smaller amounts received from some others. The entire amount has been loaned nearly all the time. The fund is administered by a committee appointed by the President of the College and approved by the Board of Administration. The rules for the loans are likewise approved by the Board. The rules allow emergency loans of \$25 to any student who has completed two semesters of work in this College. Juniors may borrow \$100 and seniors may borrow \$150. Applications for loans should be made to Prof. Albert Dickens, chairman of the Waters Loan Fund Committee, Manhattan, Kan.

THE CHAMBER OF COMMERCE LOAN FUND. The members of the Chamber of Commerce of Manhattan have raised a fund which now amounts to \$3,000 and is being augmented constantly. This is loaned to deserving students at 5 per cent per annum. Applications for loans from this fund should be addressed to the secretary, Chamber of Commerce, Manhattan, Kan.

THE STATE FEDERATION OF WOMEN'S CLUBS' LOAN FUND. Each year several of the young women students of the Kansas State Agricultural College are beneficiaries of the State Federation of Women's Clubs through the administration of its liberal young women's student loan fund. Information regarding this fund can be obtained by addressing Dean Mary P. Van Zile, Manhattan, Kan.

THE P. E. O. LOAN FUND. The P. E. O., a national organization of women, maintains an educational fund to be loaned to girls to help to defray college expenses. Information regarding this fund may be obtained from Dean Mary P. Van Zile.

PRIZES AND MEDALS

STOCK JUDGING. The Block and Bridle Club offers four medals, one gold, one silver, and two bronze, to students obtaining the highest four places in the club's stock-judging contest. The same organization offers prizes of books for stock judging. The Faculty of the Department of Animal Husbandry offers prizes of books or papers on stock judging.

DAIRY JUDGING. The Student Dairy Association each year holds a dairy-judging contest, and offers a gold, a silver, and a bronze medal to students obtaining the highest three places.

GRAIN JUDGING. The Klod and Kernel Klub holds an annual grain-judging contest. Cash prizes, subscriptions to farm papers, and ribbons are given to the highest ranking students.

PLAY WRITING. The Purple Masque Dramatic Fraternity offers each year a prize of \$50 for the best original play written by a student of the Kansas State Agricultural College and suitable for presentation by the fraternity.

ORATORY. The literary societies, through the Oratorical Board, offer each year, in the Intersociety Oratorical Contest, the following prizes:

First prize, gold medal and \$25.

Second prize, silver medal and \$15.

Third prize, bronze medal and \$10.

The Oratorical Board also finances the sending of a representative from the College to the annual Peace Oratorical Contests, to the winners of which valuable prizes in money are awarded.

The Department of Public Speaking sends to the annual Missouri Valley Contest an orator as the representative of the College. In this contest valuable prizes in money and medals are awarded.

SHORT-STORY WRITING. The Quill Club offers annually a gold medal to the student of Kansas State Agricultural College writing the best short story in a contest held by this organization.

SOCIOLOGY. The Kappa Alpha chapter of the Chi Omega Sorority offers a prize of \$25 to the student who holds the highest grade in sociology at the end of the second semester each year, the standing of the student to be determined by the instructor.

SCHOLARSHIPS

MILLING INDUSTRY. The Kansas Flour Mills Company offers \$300 annually to advanced students specializing in milling industry. This sum has been divided into three scholarships which are open to students in the Divisions of Agriculture, General Science, and Engineering who are specializing in flour milling and other milling-industry work. They are awarded on or before June 1 of each year, and except in unusual cases are not awarded to students below junior standing. Other things being equal, preference is given to residents of the state of Kansas.

In awarding these scholarships, the following points regarding the student are considered: Course of study pursued, scholarship, character and personality, and financial condition. The stipend is divided into ten monthly payments, the first payment being made September 1 and the last, June 1.

DEBATE. In the Department of English two scholarships of the value of \$100 each, one for men and one for women students, are offered annually for proficiency in intercollegiate debating.

GRADUATE ASSISTANTSHIPS

Graduate assistantships have been established for some years by action of the Board of Administration, and are available in several departments of the College. For full details see a previous paragraph in the section devoted to graduate study.

BUSINESS DIRECTIONS

General information concerning the College may be obtained from the President or the Registrar. Financial matters are handled through the office of the Business Manager, State Board of Administration, Topeka, Kan.

Scientific and practical questions, and requests for special advice along lines in which the College and the Experiment Stations are prepared to give information, should be addressed to the heads of the departments concerned with the work regarding which information is sought.

Applications for farmers' institutes should be made as early in the season as possible, to the Division of College Extension. Applications for the publications of the Agricultural Experiment Station should be addressed: Director of the Agricultural Experiment Station, Manhattan, Kan.

Donations to the Library should be addressed to the Librarian, and donations to the Museum to the Curator of the Museum.

STUDENT ASSEMBLY

The Student Assembly is held one hour each week. At this time the library, offices, classrooms, and laboratories are closed and the students gather in the College Auditorium. These assembly exercises consist of devotional services, music, and addresses. The devotional exercises are conducted by members of the Faculty, by resident ministers of the various denominations, or by prominent visitors. Excellent music is provided by the College Orchestra, by members of the Department of Music, and by available outside talent. In addition to the addresses delivered by the President and by members of the Faculty, many prominent leaders of state and national reputation are invited to address the assembly. Thus the Student Assembly has become a center of true culture and enlightenment. Although attendance is not compulsory, it is common to see nearly two thousand enthusiastic students present during these exercises.

COLLEGE PUBLICATIONS

The official organ of the College is *The Kansas Industrialist*, published and printed at the College weekly by the Department of Industrial Journalism and Printing. Its pages are filled with articles of interest, with special reference to agriculture and the industries. Particular attention is paid to information concerning the work of the College, to investigations of the Experiment Stations, and to local and alumni news. *The Kansas Industrialist* will be sent to any address for seventy-five cents a year. The alumni may have *The Kansas Industrialist* free upon application.

The Division of College Extension issues a monthly publication entitled *Agricultural Education*, of special interest to institute members.

The students of the College publish a semi-weekly periodical, *The Kansas State Collegian*, in the interest of the students at large. This paper is edited and managed by a staff elected by students. A College annual, *Royal Purple*, is published each year by the senior class.

ASSIGNMENTS

No student may be enrolled in classes before receiving an assignment, and no assignment is completed until after the incidental fee is paid.

Assignments at the dates shown in the College calendar are made in Nichols Gymnasium, where detailed directions are announced by placards. Later assignments are made by the student's assigner during regular office hours, but are subject to checking by the Registrar in respect to availability of classes. Classes are closed when the limits as to numbers are reached. A student is not admitted later than ten days after the opening of the term except by special permission of his dean. An extra fee of one dollar is charged for assignments secured after the regular dates for assignment of students at the opening of each term as announced in the College calendar, unless an acceptable reason for the tardiness is given.

A student desiring to take work at any other than the regular time must obtain the written consent of his dean, the head of the department in which the work is to be done, and the dean of the division to which the department belongs.

Each student must take full work unless excused by his dean, and more than regular work is not allowed to any student except by permission of his dean, and under no circumstances to any one who failed or was conditioned or deficient in any subject the preceding semester, or whose grade was below G in more than one subject.

A student who, at the end of the term, receives grades below passing in fifty per cent or more of the work to which he is assigned is required to leave College for at least one semester unless there are sufficiently extenuating circumstances, in which case his dean may suspend the rule and allow an assignment to twelve credit units of work.

Any student who, at the end of the term, receives grades below passing in twenty-five per cent of his assigned work is allowed not more than seventy-five per cent of the regular work next term.

Special requests concerning assignments, and permission to make up deficiencies by outside study under an approved tutor, are acted upon by the student's dean in conference with the heads of the departments involved.

CHANGES IN ASSIGNMENTS

No student may drop a study or modify his assignment except by a reassignment, and any student desiring a change in his assignment must apply to his dean. Any change in a student's assignment is made in the office of his dean. Teachers desiring that assignments be changed send requests to the proper deans. Notices of changes are furnished the Registrar, the student and the student's assigner. Changes are effective at once and the Registrar, through the heads of departments, sends notices or enrollment cards to the teachers affected.

A student receiving a notice of reassignment must at once report to classes in accordance therewith. If not content with the revised assignment, he may confer with his dean concerning it. All absences caused by a student's dropping out of class without a proper reassignment are reported by the instructor as unexcused absences.

ABSENCE AND TARDINESS

Each student must appear at the first exercises of his classes after he is assigned. Students must be present the very first day of each term or render a reasonable excuse. All absences are reported from the first day of the term, even though the student enrolled late. Failure to take out an assignment is not accepted as an excuse for absence from classes. A student is not admitted later than ten days after the opening of the term except by special permission of his dean.

Each student is required to attend every exercise of a class to which he is assigned. All absences and all cases of tardiness must be promptly accounted for on the "absence blanks." Permission for necessary absences from College, for a day or more must, in all cases, be previously obtained from the dean. Any student present at College and desiring to be excused for the day from certain classes must apply in advance to the teachers of those subjects. Any student having been absent ten hours without excuse is thereby automatically suspended from College, and is reported to the President for notification of such suspension. For reinstatement he must apply to his dean or the President.

The class record of attendance is marked immediately after the beginning of the class period. For students who come in late the record of absence may be changed to that of tardiness, but the teacher is not obliged to make such change unless the student on the day of tardiness hands to him at the close of the hour, on the "absence blank," a statement that he was present. In such a case the record is changed to agree with the facts. When a student who has been absent from College because of sickness returns, he must present to each instructor a certificate of good health from the College physician before he is permitted to remain in any classroom. The aim is to prevent the spread of any contagious disease.

Any class is excused if for any reason the instructor fails to report at the end of ten minutes after the beginning of the recitation period, unless the instructor sends word that he will be there later.

Signed reports of absences for each day are sent to the deans by the teachers before five o'clock p. m. Excuses submitted by students are transmitted with a recommendation in respect to excusing the absence. Action concerning excuse for absence is taken by the student's dean. Excuse for an absence does not relieve the student from responsibility for lecture, recitation or laboratory work lost while absent.

Any student who is found to be persistently inattentive in his College work is at once temporarily suspended by his dean, and reported to the President for permanent suspension.

EXAMINATIONS

Examinations are held at the last regular recitation periods of the respective studies at the end of each semester. Whether the examination is to extend over the last two periods or over one only is left to the decision of the individual instructor.

Any student who receives a grade of E for the semester, in any subject, and whose absences for all causes from the class in such subject do not

exceed one-tenth of the number of times the class is scheduled to meet during the semester, may be excused from the final examination in that subject, at the discretion of the instructor; provided, however, that instructors are to announce such exemption lists in their respective subjects not earlier than the last session of the class preceding the final examination.

Examinations to remove conditions are held on the fourth Saturday of each semester. A student who has received the grade C is entitled to take such special examination, provided the instructor or the department head be notified of the student's desire to take the examination not later than the Tuesday evening preceding the Saturday set for the examinations. If a subject in which a student is conditioned is not passed at the first opportunity, the grade is changed from C to F.

Permission for examination in subjects not taken in class must be obtained on recommendation of the professor in charge, from the dean of the division in which the student is assigned. Permission to take such examination is not granted unless the preparation for it is made under an approved tutor. All such examinations are under the immediate supervision of the professor in whose department the subject falls.

GRADES

Student grades are designated by the letters E, G, M, P, C, F, and U, having the following significance and order of rank:

The grade E designates really distinguished achievement, and is the net resultant of exceptionally good mental ability in conjunction with serious application. It is expected that this grade will not include more than ten per cent of all grades given a class, and usually will include about five per cent.

The grade G represents superior achievement, better than that exhibited by the average student, but not distinguished. It is recognized as a mark of considerable honor and is the resultant of high ability and fair application, or of fair ability and serious application. The percentage of students assigned this grade will depend somewhat upon the number assigned grade E, but the sum of grades E and G should approximate twenty-five per cent of all grades assigned.

The grade M represents the standing of about half of all students in the College. It means achievement equal to that of the average of students, and includes about half of all student grades. It indicates neither superior nor inferior accomplishment.

The grade P, meaning passed, represents achievement of a grade below that of the average of students. It indicates a student's position as being in the upper part of the lower fourth of the class and his work as being such as may be described as poor, or inferior. The number of grades P awarded, together with the grades C and F, should not, on the whole, exceed twenty-five per cent of all, and are expected to include about that proportion.

The grade C, meaning conditioned, is the symbol used to represent two types of inferior work: (a) that which is deficient in quality, and (b) that which is satisfactory as to quality but inadequate as to quan-

tity. The results of examinations to remove conditions are reported simply as P (passed) or F (failed), and such examinations not taken are recorded as F.

The grade F, meaning failed, is used to indicate work that is so unsatisfactory as to require that the work be repeated in class or under an approved tutor.

The letter U, meaning unfinished, is reported when, in the judgment of the instructor, the student deserves further time to complete work which has been interfered with by illness or other excusable cause of absence or disability. This is only a temporary report and in no way prejudices the student's final grade in a course.

HONORS

In each of the divisions of the College "junior honors" are awarded at Commencement to not more than five per cent of the junior class having the highest standing up to the close of the junior year.

In a similar manner "senior honors" are awarded to not exceeding five per cent of the senior class having the highest standing up to the close of the senior year.

HONOR SOCIETIES

A chapter of Phi Kappa Phi, an honor scholarship fraternity, membership in which is open to honor graduates of all departments of American universities and colleges, was installed at the Kansas State Agricultural College on November 15, 1915. The eligibility of undergraduates to membership is determined on the basis of their scholarship. The candidates are elected to membership at the October, April and June meetings of the chapter.

The honor society of agriculture, Gamma Sigma Delta, has as its object the encouragement of high standards of scholarship in all branches of agricultural science and education, and the encouragement of a high degree of excellence in the practice of agricultural pursuits. Seniors whose grades place them in the upper one-fourth of their class are eligible for membership. Election is in the hands of Faculty members of the local chapter.

Besides these, above mentioned, there are a number of honor fraternities, sororities and societies which are open to students in different divisions of the College or in different activities. These are treated later under the heading "Student Organizations."

CREDITS FOR EXTRA WORK

Activities connected with the College, but not provided for by any of the curricula, either as required subjects or as electives, are designated as *extra subjects*.

Credit for extra work may be given when the student is regularly assigned to the work in accordance with the general rules governing assignments. A student may be assigned to extra work for credit upon the written recommendation of the instructor in charge of the work. This recommendation is filed in the office of the student's dean, and is effective until revoked.

Credits earned for extra work may be counted as part or all of the electives in any of the College curricula. In curricula that do not include electives, credits for extra work are available only as substitutions for required work, and must be approved in the regular way before becoming effective. A total of not more than eight semester credits may be allowed a student for extra work, and not more than two of these may be obtained in any one semester.

The number of semester credits that may be allowed for extra work is as follows:

| <i>Subject</i> | <i>Per semester</i> | <i>Total</i> |
|--|---------------------|--------------|
| Physical Training | 1 | 4 |
| Orchestra | 1 | 4 |
| Band | 1 | 4 |
| Choral Society | 1 | 4 |
| Debate | 2 | 4 |
| Oratorical Contest | 2 | 4 |
| <i>Kansas State Collegian</i> journalism | 1 | 4 |
| Military Science | 2 | 8 |

BIBLE STUDY

Bible study is an elective. Two semester credits are granted for each completed one-year course. Credit may be granted to any one student for not more than two courses. Teachers of classes are to be approved as tutors, and the supervision of the work is placed in the Department of Education. This department also conducts the examinations for credit in Bible study.

COURSE NUMBERS

Each course offered bears a number indicating in a general way the standing of students for whom it is given. Courses for undergraduates bear numbers 101 to 199, courses for undergraduates and graduates bear numbers 201 to 299, and courses for graduates only bear numbers 301 to 399. The numbers 1 to 29 are applied to studies offered for short-course students, the numbers 31 to 49 are assigned to Summer School subjects not taught for entrance credit or for College credit, and subjects which give credit in the School of Agriculture are numbered 51 to 99.

In applying this system, the courses offered by any department are numbered independently of all other departments of the College.

CLASSES

The minimum numbers for which classes are organized are as follows:

| | |
|------------------------------|----|
| School of Agriculture | 18 |
| Freshmen or sophomores | 12 |
| Juniors or seniors | 7 |

This rule is varied only by special permission of the Board of Administration.

Division of Agriculture

FRANCIS DAVID FARRELL, *Dean*

The teaching of rational, practical agriculture is fundamental to development in a state whose principal industries are agricultural. Kansas prospers in direct proportion to the productivity of her soil and to the effectiveness with which it is utilized. Effective utilization of the agricultural resources of the state depends upon the success with which the agricultural industries of the state are developed. In order to succeed in farming it is necessary to know something of the soil, the conservation of its fertility and moisture, and its proper cultivation; the kinds of plants to grow and how to improve them; the selection, breeding, and feeding of live stock; the maintenance of orchards, gardens, and attractive surroundings; farm building, and the equipment of the farm and the farm home with modern conveniences; the best methods of marketing the products of the farm; and in addition to all this, how to make the farm home the center of influence for good citizenship in the agricultural community.

A man may learn many of these things through practical experience, and thus become successful in modern farming. But practical experience alone is slow and expensive. The Agricultural College furnishes a means of acquiring systematic training in agriculture which fits young men adequately for the farm for a moderate expenditure of time and money.

In addition to training men for service as farmers, the College prepares students for various other activities which must be carried on if the agriculture of the state and nation is to be developed properly. These activities include scientific investigation of agricultural problems in state and national institutions, agricultural extension work, teaching of agriculture, service in the industries directly involving agriculture and a variety of other lines of public and private service of an agricultural nature. The demand for well-trained, reliable men in all these lines is always extensive. The primary aim of the College in training men in agriculture is to fit them for service in which they will develop into agricultural leaders, either as farmers or in some other capacity, and as such, contribute to the upbuilding of rural institutions and the improvement of American country life.

EQUIPMENT

The facilities for such training at this College are of a high order. The College owns 1,136 acres of land, which is used for investigation, instruction, and demonstration in the various courses in agriculture and allied branches. The campus, which comprises 160 acres, is one of the best examples of ornamental tree planting and forestry in the state. Students working daily amid such surroundings can scarcely fail to gain

an appreciation or love for the beautiful. A tract of 320 acres is devoted to the work in agronomy; for horticulture and forestry work, 80 acres are used; for dairy work, about 160 acres; and for animal husbandry, about 400 acres. The herds and flocks contain all important breeds of dairy and beef cattle, hogs, horses, and sheep. Many of these animals have won championships at local and state fairs in recent years. With this class of stock available for the work in judging, the student is supplied with types of the best breeds, and becomes familiar with these types by actual handling of the stock.

CURRICULA IN AGRICULTURE

The various needs of the student of agriculture are met by the following curricula:

A four-year curriculum in agriculture.

A six-year curriculum in animal husbandry and veterinary medicine.

A three-year curriculum in agriculture in the School of Agriculture—the secondary school of the Agricultural College. (The work of the School of Agriculture is open to students of high-school grade and is discussed in another section of the catalogue.)

Various special courses. (The work of these courses is discussed in another section of the catalogue.)

DEGREES

The four-year course in agriculture leads to the degree of Bachelor of Science (in agriculture).

The six-year curriculum in animal husbandry and veterinary medicine, the last two years of which are given in the Division of Veterinary Medicine, leads to the degree of Bachelor of Science at the end of four years, and to the degree of Doctor of Veterinary Medicine at the end of two more years.

THE CURRICULUM IN AGRICULTURE

The four-year curriculum in agriculture is designed to meet the needs primarily of the students who expect to return to the farm. However, the student who completes the curriculum will have had sufficient training to enable him to enter some one of the many lines of agricultural industry as a specialist. The demand for men thus trained is constantly increasing, and such positions offer attractive opportunities for men who by nature and training are adapted to the work. The United States Department of Agriculture, the state colleges and departments of agriculture, high schools, private institutions of secondary and college rank, and a great variety of commercial interests, are constantly demanding men trained in agriculture.

The young man who expects to make farming his life work can start with no better asset than the thorough training in practical and scientific agriculture afforded by the four-year curriculum. The American farmer needs more of the skill that comes through the training of the hand, in order that he may better do the work of farming; but infinitely more, he needs the training of the mind in the fundamental truths that underlie every operation in farming, in order that he may use the skill of the

craftsman with reason and judgment. One may learn to plow a field with the greatest skill; the work may be a model of its kind. If, however, it is plowed with utter disregard of the moisture conditions which prevail the result may be a failure. To understand the conditions which should determine when and how to plow is the work of the trained mind; the other is the work of the trained hand. The farmer and the teacher of farming must possess both kinds of training, and the curriculum has been revised with this fact in view, and has been so arranged that *the student begins his practical training in agriculture on the first day he enters College.*

ANALYSIS OF THE CURRICULUM

One hundred thirty-one semester credits in addition to military science are required for graduates, as follows:

| | Semester credits | |
|--|------------------|-----|
| Prescribed agriculture | 45 | |
| Electives in agriculture, required with their prerequisites..... | 21 | |
| Required in agriculture | — | 66 |
| Prescribed in nonagriculture | 43 | |
| Electives in nonagriculture, required..... | 6 | |
| Electives that may be nonagriculture..... | 16 | |
| Total allowed in nonagriculture..... | — | 65 |
| Required in military science | | 4 |
| Total semester credits for graduation..... | | 135 |

As shown in the above general outline and in the tabulated curriculum given hereafter, the candidate for graduation must have completed one hundred thirty-five College semester credits. The twelve major electives required must be taken from some one of the departments of the Division of Agriculture. During the first semester of his junior year each student is required to file a formal statement in the dean's office making selection of the department in which he will major. The nine minor electives must support the major work. They may be taken from more than one department, and may even be selected from departments in other divisions of the College, but they must directly strengthen the student's preparation in agriculture. At the discretion of the student, twenty-two elective credits may be nonagricultural. However, nine semester credits of the junior electives and the seven senior semester credits, designated "free electives," may be earned in any College credit courses and may be chosen without restriction. Any candidate for a degree in agriculture must also have had at least six months' farm experience approved by the dean of the Division of Agriculture. A formal statement giving information as regards this experience must be filed in the dean's office during the last semester of the senior year.

The student who completes the freshman and sophomore years will have had, in addition to the fundamental work in chemistry, zoölogy, botany, English, and animal or plant physiology, practical studies in grain- and forage-crop production, live stock, dairying, poultry, and horticulture, and the fundamentals of agricultural economics. These two years give the student a general knowledge of the whole range of practical agriculture, more than one-third of his time being devoted to strictly agricultural courses.

During the junior and senior years the student continues his studies of fundamental science and learns to apply science to agriculture. He

is led step by step to understand the scientific relations of every farming operation. There is so much agriculture to be taught that it becomes necessary for the student to determine which of the general lines he should emphasize most. This is made possible by numerous electives in soils, crops, agricultural economics, animal husbandry, dairy husbandry, horticulture, milling, and poultry husbandry.

STATE TEACHERS' CERTIFICATES

By the selection of proper electives in the Department of Education, the four-year curriculum in agriculture may not only lead to the degree of Bachelor of Science (in agriculture), but at the same time qualify the student for the three-year Kansas state teachers' certificate, renewable for life and valid in any high school or any other public school in the state. A student desiring to qualify for teaching should begin his professional preparation by electing psychology, first semester, junior year. A total of eighteen semester credits in the Department of Education is required for this certificate. These must include the following courses: psychology, educational administration, and educational sociology.

STATE CERTIFICATES FOR TEACHERS OF VOCATIONAL AGRICULTURE

The forty-three semester hours of electives provided in this curriculum in agriculture may be so chosen as thoroughly to prepare the student for the teaching of vocational agriculture in schools participating in the Federal Smith-Hughes funds. The following are the electives suggested for those preparing to be supervisors or teachers of vocational agriculture:

| | <i>Semester credits</i> |
|--|-------------------------|
| Professional work in education..... | 18 |
| Psychology IV | 3 |
| Educational Administration II | 3 |
| Educational Sociology II | 3 |
| Special Methods of Teaching Agriculture..... | 3 |
| Observation and Supervised Teaching..... | 3 |
| Agricultural Education | 3 |
| Farm Management | 3 |
| Farm Motors | 3 |
| Woodwork | 2 |
| Forging | 2 |
| Farm Shop Practice | 3 |
| Senior major electives | 12 |
| Total | 43 |

Such a selection of electives meets the requirements of the elective groups in the curriculum and includes a minimum of agricultural engineering. However, the student is advised to select a few additional credit hours in farm engineering if possible.

Candidates for the certificate in vocational agriculture must also have had not less than two full years of actual farm experience in labor or management, at least one of which shall have been continuous so as to give practical contact with farm conditions during all seasons.

THE CURRICULUM IN ANIMAL HUSBANDRY AND VETERINARY MEDICINE

A combined curriculum in animal husbandry and veterinary medicine has been outlined so that students may receive the degree of Bachelor of Science in Agriculture at the end of four years, and the degree of Doctor of Veterinary Medicine at the end of two years more, thus securing both degrees in six years.

Curriculum in Agriculture

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours of recitation each week; the second shows the number of hours to be spent in laboratory work each week; and the third, where there is one, indicates the number of hours of outside work in connection with the laboratory required each week.

FRESHMAN

FIRST SEMESTER

| | |
|---|-----------|
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Chemistry I | |
| Chem. 101 | 5(3-6) |
| General Botany I | |
| Bot. 101 | 3(1-4, 2) |
| Market Grades and Classes of Live Stock | |
| An. Husb. 131 | 3(1-6) |
| Dairy Judging | |
| Dairy Husb. 104 | 1(0-3) |
| Library Methods | |
| Lib. Ec. 101 | 1(1-0) |
| Agricultural Lectures | |
| Gen. Agric. 101..... | R(1-0) |
| Military Science A-I | |
| Mil. Tr. 101..... | 1(0-4) |
| Physical Education M-I | |
| Phys. Ed. 103..... | R(0-2) |

SECOND SEMESTER

| | |
|-------------------------|-----------|
| College Rhetoric II | |
| Engl. 104 | 3(3-0) |
| Chemistry II | |
| Chem. 102 | 5(3-6) |
| General Botany II | |
| Bot. 105 | 3(1-4, 2) |
| Plant Propagation | |
| Hort. 101 | 3(2-3) |
| Elements of Dairying | |
| Dairy Husb. 101 | 3(2-3) |
| Military Science A-II | |
| Mil. Tr. 102 | 1(0-4) |
| Physical Education M-II | |
| Phys. Ed. 104 | R(0-2) |

SOPHOMORE

FIRST SEMESTER

| | |
|-------------------------------------|-----------|
| Organic Chemistry | |
| Chem. 120 | 3(2-3) |
| Agricultural Economics | |
| Ag. Ec. 101 | 3(3-0) |
| Anatomy and Physiology ³ | |
| Anat. 131 | 3(2-3) |
| Grain Crop Production | |
| Agron. 101 | 3(2-2, 1) |
| Plant Pathology I | |
| Bot. 116 | 3(1-4, 2) |
| Farm Poultry Production | |
| Poult. Husb. 101 | 2(1-2, 1) |
| Military Science A-III | |
| Mil. Tr. 103..... | 1(0-4) |
| Physical Education M-III | |
| Phys. Ed. 105..... | R(0-2) |

SECOND SEMESTER¹

| | |
|--|-----------|
| Quantitative Analysis I ² | |
| Chem. 150 | 2(0-6) |
| Principles of Feeding | |
| An. Husb. 152 | 3(3-0) |
| General Zoölogy | |
| Zoöl. 105 | 5(3-6) |
| Forage Crop Production | |
| Agron. 102 | 3(2-2, 1) |
| Breeding Types and Classes of Live Stock | |
| An. Husb. 137 | 2(0-6) |
| Orcharding | |
| Hort. 107 | 2(1-3) |
| Military Science A-IV | |
| Mil. Tr. 104..... | 1(0-4) |
| Physical Education M-IV | |
| Phys. Ed. 106..... | R(0-2) |

JUNIOR

FIRST SEMESTER

| | |
|------------------------------|--------|
| Genetics | |
| An. Husb. 221..... | 3(3-0) |
| Soils | |
| Agron. 131 | 4(3-3) |
| Agricultural Microbiology | |
| Bact. 106 | 3(1-6) |
| Electives ⁴ | 6 |

SECOND SEMESTER

| | |
|------------------------------|--------|
| Soil Fertility | |
| Agron. 132 | 3(2-3) |
| Agricultural Journalism | |
| Ind. Jour. 164 | 1(1-0) |
| General Entomology | |
| Ent. 101 | 3(2-3) |
| Electives ⁴ | 9 |

¹ During the second semester each year every sophomore is notified by the Dean that he must advise the Dean's office not later than the first semester of the junior year regarding his selection of the department in which he will major.

² Students preparing for the teaching of vocational agriculture may, with the approval of the Dean of Agriculture, substitute Rural Architecture (Farm Engr. 102) for this course.

³ Students who do not expect to major in animal husbandry or dairy husbandry may, with the approval of the Dean of Agriculture, substitute Plant Physiology I (Bot. 208) for this course.

⁴ Six semester credit hours of junior electives must be chosen from the work offered in history, economics, education, modern languages, or mathematics. Students preparing to teach should take not less than eleven semester credit hours of junior electives in the Department of Education.

SENIOR

| FIRST SEMESTER | | SECOND SEMESTER | |
|------------------------------------|---------|---|---------|
| Agricultural English ¹ | | Agricultural Relationships ¹ | |
| Engl. 137 | 3 (3-0) | Gen. Agric. 201 | 1 (1-0) |
| Major electives ² | 6 | Major electives ² | 6 |
| Minor electives ³ | 4 | Minor electives ³ | 5 |
| Free electives ⁴ | 3 | Free electives ⁴ | 4 |

Agricultural Electives for Students in the Curriculum in Agriculture

AGRICULTURAL ECONOMICS

SECOND SEMESTER

| |
|--|
| Marketing of Farm Products |
| 3 (3-0) |
| Advanced Farm Management |
| 3 (1-6) |
| Agricultural Industries |
| 2 (2-0) |
| Agricultural Land Problems |
| 2 (2-0) |
| Conservation of Agricultural Resources |
| 2 (2-0) |
| Agricultural Finance |
| 2 (2-0) |
| Agricultural Economic Problems |
| 3 (3-0) |
| Agricultural Economics Seminar |
| 1 (1-0) |

EACH SEMESTER

| |
|---|
| Farm Cost Accounting |
| 2 (1-3) |
| Farm Management |
| 3 (2-3) |
| Research in Agricultural Economics |
| (1 to 5 semester credits for graduates) |

¹ The courses in Agricultural English and Agricultural Relationships are open to seniors only.

² Major electives must be chosen from one department in the Division of Agriculture and approved by the head of the department.

³ Minor electives may be chosen from more than one department. They must be agricultural courses, or closely related science, and they must support the major work.

⁴ Students preparing to teach must use senior free electives in completing their requirements for the state teachers' certificate.

AGRONOMY

FIRST SEMESTER

- Seed Identification and Weed Control
2(1-3)
- Advanced Forage Crops
2(1-3)
- Advanced Soil Fertility
2(1-3)
- Soil Management
2(1-3)
- Principles of Agronomic Experimentation
1(1-0)
- Pasture Management
2(1-3)
- Plant Genetics
3(3-0)

SECOND SEMESTER

- Crop Improvement
3(2-3)
- Advanced Grain Crops
2(1-3)
- Special Crops
2(2-0)
- Dry-land Farming
2(2-0)

EACH SEMESTER

- Crops Research (for graduates)
Crop Problems
- Soils Research (for graduates)
Soil Problems
- Advanced Soils Laboratory
- Pasture Management Research (for graduates)
(One or more semester credits each, according to work done)
- Genetics Seminar
1(1-0)

ANIMAL HUSBANDRY

FIRST SEMESTER

- Advanced Stock Judging I
2(0-6)
- Form and Function in Live Stock
2(0-6)
- Horse Production
3(2-3)
- History of Breeds and Pedigrees
3(2-3)
- Sheep Production
3(2-3)
- Advanced Feeding
2(2-0)

SECOND SEMESTER

- Animal Breeding
3(3-0)
- Advanced Genetics
4(3-3)
- Advanced Meats
(2 to 4 semester credits)

SECOND SEMESTER

- Systems of Live-Stock Production
3(3-0)
- Advanced Stock Judging II
2(0-6)
- Beef Cattle Production
3(2-3)
- Swine Production
3(2-3)
- Advanced Studies in Pedigrees
3(1-6)
- Animal Husbandry Seminar
1(1-0)
- The Wool Industry
3(2-3)
- Live-stock Marketing
2(2-0)

EACH SEMESTER

- Meats
2(1-3)
- Genetics Seminar
1(1-0)
- Research in Genetics
(4 to 10 semester credits)
- Research in Animal Husbandry
(6 to 16 semester credits)

SUMMER SCHOOL

- Teachers' Course in Animal Husbandry
4(6-6)

DAIRY HUSBANDRY

FIRST SEMESTER

- Butter Making and Creamery Management
3(2-3)
Market Milk
2(1-3)

SECOND SEMESTER

- Dairy Inspection I
2(1-3)
Milk Production
3(3-0)
Cheese and Ice-cream Making
3(2-3)
Advanced Dairy Judging
1(0-3)
Dairy Herd Management
2(1-3)
Dairy Seminar
1(1-0)

Dairy Research
(3 semester credits)
(Each semester, for graduates)

HORTICULTURE

FIRST SEMESTER

- Systematic Pomology
4(2-6)
Farm Forestry
4(3-3)
Practical Pomology
3(2-3)
Spraying
2(1-3)
Subtropical Pomology
2(2-0)
Advanced Pomology
3(2-3)
Horticulture Seminar
1(1-0)
Greenhouse Construction and Management
3(3-0)
History and Literature of Landscape
Gardening 2(2-0)
The Theory and Aesthetics of Landscape
Gardening 3(2-3) (for graduates)

SECOND SEMESTER

- Small Fruits
2(2-0)
Dendrology
3(1-6)
Silviculture
3(2-3)
Market Gardening
3(2-3)
Landscape Gardening I
4(2-6)
School Gardening
3(2-3)
Plant Materials in Landscape Gardening
3(2-3)
Landscape Gardening II
3(09) (for graduates)
Tree Surgery
2(1-3)
Landscape Gardening III
2(1-3)

EACH SEMESTER

- Civic Art
3(3-0)

Orchard Problems

Market Gardening Problems

Pomological Research

Forcing Flowers and Vegetables

(One or more semester credits each, according to work done)

MILLING INDUSTRY

FIRST SEMESTER

- Grain Marketing
3(3-0)
Wheat and Flour Testing
4(1-9)

SECOND SEMESTER

- Principles of Milling
1(0-3)
Grain Products
2(2-0)
Milling Practice I
3(1-6)
Milling Practice II
2(0-6)
Experimental Baking A
2(0-6)

POULTRY HUSBANDRY

FIRST SEMESTER

Practice in Poultry Feeding
(1 semester credit)

Practice in Milk Feeding
(1 semester credit)

Poultry Breeds and Types
2(1-3)

Market Poultry
2(1-3) or 3(1-6)

SECOND SEMESTER

Practice in Incubation
(1 or 2 semester credits)

Practice in Brooding
(1 to 3 semester credits)

Advanced Poultry Judging
1(0-3)

Poultry Breeding
2(0-6)

Poultry Farm Management
3(2-3)

Poultry Bacteriology
3(1-6)

Comparative Anatomy of Domestic Birds
3(1-6)

BOTH SEMESTERS AND SUMMER SCHOOL

Poultry Research
(2 or more semester credits, for graduates)

Poultry Problems
(2 or more semester credits)

Electives for Agricultural Students, with Their Prerequisites

MAJOR ELECTIVES

| <i>Subject</i> | <i>Prerequisites</i> |
|---|---|
| AGRICULTURAL ECONOMICS: | |
| Farm Management | Agricultural Economics, Soils, and Principles of Feeding |
| Farm Cost Accounting..... | Agricultural Economics |
| Advanced Farm Management..... | Farm Management |
| Agricultural Industries | Agricultural Economics |
| Agricultural Land Problems..... | Agricultural Economics |
| Research in Agricultural Economics... | Consult Instructor |
| Marketing Farm Products..... | Agricultural Economics |
| Conservation of Agricultural Resources, | Agricultural Economics |
| Agricultural Finance | Agricultural Economics |
| Agricultural Economics Problems..... | Agricultural Economics |
| Agricultural Economics Seminar..... | Agricultural Economics |
| AGRONOMY: | |
| Seed Identification and Weed Control.. | Grain Crop Production, Forage Crop Production |
| Special Crops | Grain Crop Production, Forage Crop Production |
| Crop Improvement | Grain Crop Production, Forage Crop Production, Genetics |
| Advanced Grain Crops..... | Grain Crop Production |
| Advanced Forage Crops..... | Forage Crop Production |
| Principles of Agronomic Experimentation, | Crop Improvement, Soil Fertility |
| Agronomy Seminar | Grain Crop Production, Forage Crop Production, Soils |
| Pasture Management | General Botany II, Forage Crop Production |
| Plant Genetics | Genetics |
| Genetics Seminar | Consult instructors |
| Crop Problems | Advanced Grain Crops, Advanced Forage Crops |
| Crops Research (for graduates)..... | Advanced Grain Crops, Advanced Forage Crops |
| Pasture Management Research (for graduates) | Pasture Management, Surveying II, Ecology, Taxonomic Botany |
| Dry-land Farming | Soils |
| Advanced Soil Fertility | Soil Fertility |
| Soil Survey | Soils |
| Soil Management | Soil Fertility |
| Advanced Soils Laboratory..... | Soil Fertility |
| Soils Research (for graduates)..... | Soil Fertility, Quantitative Analysis I |
| Soil Problems | Depends on problem given |

| <i>Subject</i> | <i>Prerequisites</i> |
|---|--|
| ANIMAL HUSBANDRY: | |
| Advanced Stock Judging I..... | Breeding Types and Classes of Live Stock |
| Advanced Stock Judging II..... | Advanced Stock Judging I |
| Form and Function in Live Stock..... | Advanced Stock Judging II |
| History of Breeds and Pedigrees..... | Market Grades and Classes of Live Stock |
| Beef Cattle Production | Breeding Types and Classes of Live Stock, Principles of Feeding, Advanced Judg- ing I, and History of Breeds and Pedi- grees |
| Swine Production | Breeding Types and Classes of Live Stock, Principles of Feeding, Advanced Judg- ing I, and History of Breeds and Pedi- grees. |
| Sheep Production | Breeding Types and Classes of Live Stock, Principles of Feeding, Advanced Judg- ing I, and History of Breeds and Pedi- grees. |
| Horse Production | Breeding Types and Classes of Live Stock, Principles of Feeding, Advanced Judg- ing I, and History of Breeds and Pedi- grees. |
| Meats | Breeding Types and Classes of Live Stock, Principles of Feeding |
| Animal Breeding | Genetics |
| Advanced Genetics | Genetics |
| Genetics Seminar | Consult instructors |
| Research in Genetics | Advanced Genetics |
| Advanced Studies in Pedigrees..... | History of Breeds and Pedigrees |
| Advanced Feeding | Principles of Feeding |
| Advanced Meats | Meats |
| The Wool Industry | Sheep Production |
| Systems of Live-stock Production..... | Beef Cattle Production, Swine Production, Sheep Production, Horse Production |
| Live-stock Marketing | Beef Cattle Production, Swine Production, Sheep Production, Horse Production |
| Animal Husbandry Seminar..... | Principles of Feeding. |
| Teachers' Course in Animal Husbandry, Genetics | None. |
| Research in Animal Husbandry (for graduates)..... | General Zoölogy and General Botany II |
| | Beef Cattle Production, Swine Production, Sheep Production, and Horse Production |
| DAIRY HUSBANDRY: | |
| Dairy Inspection I..... | Agricultural Microbiology, Dairy Chemistry, Elements of Dairying |
| Milk Production | Elements of Dairying, Principles of Feeding |
| Butter Making and Creamery Manage- ment | Elements of Dairying, Dairy Bacteriology |
| Cheese and Ice Cream Making..... | Elements of Dairying, Dairy Bacteriology, Dairy Chemistry |
| Market Milk | Elements of Dairying, Dairy Bacteriology |
| Advanced Dairy Judging..... | Dairy Judging |
| Dairy Herd Management..... | Milk Production |
| Dairy Seminar | Elements of Dairying, Dairy Inspection I, Milk Production |
| Dairy Research for graduates)..... | Milk Production, Butter Making and Creamery Management |
| HORTICULTURE: | |
| Systematic Pomology | Orcharding |
| Small Fruits | Plant Propagation |
| Farm Forestry | None |
| Dendrology | None |
| Silviculture | Farm Forestry or Dendrology |
| Gardening | None |
| Landscape Gardening I..... | None |
| Greenhouse Construction and Manage- ment | None |
| School Gardening | None |
| Spraying | Chemistry II |
| Market Gardening | None |
| History and Literature of Landscape Gardening | None |
| Plant Materials of Landscape Garden- ing | Plant Propagation |
| Tree Surgery | Plant Physiology I |
| Landscape Gardening II (for graduates) | Landscape Gardening I |

Subject

Prerequisites

HORTICULTURE—concluded.

| | |
|--|--|
| Theory and Æsthetics of Landscape Gardening (for graduates)..... | History and Literature of Landscape Gardening |
| Market Gardening Problems (for graduates) | Consult instructors |
| Pomological Research Work (for graduates) | Consult instructors |
| Forcing Fruits and Vegetables (for graduates) | Consult instructors |
| Subtropical Pomology | Systematic Pomology |
| Practical Pomology | Systematic Pomology |
| Advanced Pomology | Systematic Pomology |
| Orchard Problems | Systematic Pomology |
| Civic Art | History and Literature of Landscape Gardening |
| Horticulture Seminar | Systematic Pomology and Orcharding |
| Landscape Gardening III (for graduates) | Landscape Gardening I and Plant Materials in Landscape Gardening |

MILLING INDUSTRY:

| | |
|-------------------------------|---|
| Principles of Milling..... | None |
| Grain Marketing | Grain Crop Production |
| Grain Products | Grain Marketing |
| Milling Practice I..... | Principles of Milling |
| Milling Practice II..... | Milling Practice I |
| Wheat and Flour Testing | Grain Products, Organic Chemistry, and Advanced Quantitative Analysis |
| Experimental Baking A..... | Wheat and Flour Testing |

POULTRY HUSBANDRY:

| | |
|--|--|
| Practice in Poultry Feeding..... | Farm Poultry Production |
| Practice in Incubation..... | Farm Poultry Production |
| Practice in Brooding..... | Farm Poultry Production |
| Practice in Milk Feeding..... | Farm Poultry Production |
| Poultry Breeds and Types..... | None |
| Advanced Poultry Judging..... | Poultry Breeds and Types |
| Market Poultry | Farm Poultry Production |
| Poultry Breeding | Genetics |
| Poultry Farm Management..... | Farm Management |
| Poultry Bacteriology | Microbiology |
| Poultry Anatomy | Anatomy and Physiology |
| Comparative Anatomy of Domestic Birds..... | Embryology |
| Poultry Problems | Farm Poultry Production, Practice in Poultry Feeding, Practice in Incubation, and Practice in Brooding |
| Poultry Research (for graduates)..... | Farm Poultry Production, Practice in Poultry Feeding, Practice in Incubation, and Practice in Brooding |

OTHER ELECTIVES

APPLIED MECHANICS:

| | |
|---------------------------|---------------------|
| Engineering Drawing | None |
| Mechanical Drawing I..... | Engineering Drawing |

BACTERIOLOGY:

| | |
|----------------------------|---------------------------|
| Soil Microbiology | Agricultural Microbiology |
| Dairy Bacteriology | Agricultural Microbiology |
| Poultry Bacteriology | Agricultural Microbiology |

BOTANY:

| | |
|--|-------------------|
| Plant Physiology I..... | General Botany II |
| Taxonomic Botany | General Botany II |
| Field Crops and Vegetable Diseases.... | Plant Pathology I |
| Fruit Crop Diseases..... | Plant Pathology I |
| Economic Botany | General Botany II |

CHEMISTRY:

| | |
|--|--|
| Advanced Inorganic Chemistry..... | Chemistry II |
| Inorganic Preparations | Chemistry II |
| Organic Chemistry I..... | Chemistry II |
| Organic Chemistry II..... | Organic Chemistry I |
| Organic Preparations | Organic Chemistry II |
| Principles of Animal Nutrition..... | Organic Chemistry |
| Physiological Chemistry | Organic Chemistry |
| Physical Chemistry | Quantitative Analysis |
| Quantitative Analysis II..... | Chemistry II |
| Chemistry of Soils and Fertilizers.... | Quantitative Analysis I |
| Chemistry of Plant Products..... | Quantitative Analysis I, Organic Chemistry |
| Chemistry of Dairy Products..... | Quantitative Analysis I, Organic Chemistry |
| Chemistry of Meats..... | Quantitative Analysis I, Organic Chemistry |

| <i>Subject</i> | <i>Prerequisites</i> |
|---|---|
| CIVIL ENGINEERING: | |
| Surveying I | Trigonometry |
| Surveying II | Surveying I |
| Elements of Irrigation and Drainage.. | None |
| ECONOMICS AND SOCIOLOGY: | |
| Economics | None |
| Sociology | None |
| Rural Sociology | None |
| Business Organization | Economics |
| Money and Banking | Economics |
| Business Management | Economics |
| Current Economic Problems | Economics |
| Social Problems | Sociology or Economics |
| Community Problems | Sociology or Economics |
| EDUCATION: | |
| Psychology | None |
| Educational Administration B | None |
| Educational Sociology B | None |
| Agricultural Education | Educational Administration |
| Special Methods in the Teaching of Agriculture | Psychology |
| Rural Education | Educational Administration |
| Supervised Observation and Teaching in Agriculture | Psychology |
| ENGLISH: | |
| Argumentation and Debate | College Rhetoric II |
| Oral English I | College Rhetoric II |
| Farm Advertising | College Rhetoric II |
| Farm Bulletins | College Rhetoric II |
| ENTOMOLOGY: | |
| Apiculture | General Entomology |
| Milling Entomology | General Entomology |
| Horticultural Entomology | General Entomology |
| General Economic Entomology | General Entomology |
| Insect Morphology I | General Entomology |
| FARM ENGINEERING: | |
| Rural Architecture | None |
| Field Machinery | None |
| Farm Motors | None |
| Tractors and Trucks | Farm Motors |
| Power Machinery | Field Machinery |
| Advanced Farm Machinery | Power Machinery |
| Farm Machinery Research | Power Machinery |
| Farm Equipment | None |
| Farm Sanitation and Water Supply | None |
| GEOLOGY: | |
| Dynamic and Structural Geology | None |
| Historical Geology | Dynamic and Structural Geology |
| HISTORY AND CIVICS: | |
| American History I | None |
| American History II | None |
| American History III | None |
| American Agricultural History | None |
| American Industrial History | None |
| American Political History | None |
| Modern Europe | None |
| Current History | None |
| American Government | None |
| Business Law I | None |
| Farm Law | None |
| INDUSTRIAL JOURNALISM: | |
| Industrial Writing | Elementary Journalism or Agricultural Journalism |
| Industrial Feature Writing | Industrial Writing |
| Journalism Practice I | May be taken with Agricultural Journalism |
| MATHEMATICS: | |
| Plane Trigonometry | Plane Geometry, and 1½ units of high-school algebra |
| College Algebra | Plane Geometry, and 1½ units of high-school algebra |
| Analysis of Statistics | None |

Subject

Prerequisites

SHOP PRACTICE:

| | |
|--------------------------------|--------------------------------|
| Woodwork I | None |
| Woodwork II | Woodwork I |
| Woodwork III | Woodwork II |
| Woodworking for Grammar Grades | None |
| Woodworking I for High Schools | Woodworking for Grammar Grades |
| Farm Shop Practice | None |
| Forging I | None |
| Forging II | Forging I |

STEAM AND GAS ENGINES:

| | |
|---------------------|------|
| Dairy Refrigeration | None |
|---------------------|------|

SURGERY AND MEDICINE:

| | |
|---|--|
| Farm Animals in Health and in Disease, Anatomy and Physiology | |
|---|--|

ZOOLOGY:

| | |
|-------------------------------|-------------------------------------|
| Embryology | General Zoölogy |
| Parasitology | General Zoölogy |
| Economic Zoölogy | General Zoölogy |
| Advanced Invertebrate Zoölogy | General Zoölogy |
| Advanced Vertebrate Zoölogy | General Zoölogy |
| Animal Ecology | General Zoölogy, General Entomology |

Curriculum in Animal Husbandry and Veterinary Medicine*

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

Freshman year of the Curriculum in Agriculture

SOPHOMORE

FIRST SEMESTER

| | |
|--------------------------|-----------|
| Organic Chemistry | |
| Chem. 120 | 3(2-2, 1) |
| General Zoölogy | |
| Zoöl. 105 | 5(3-6) |
| Anatomy I | |
| Anat. 101 | 6(3-9) |
| Grain Crop Production | |
| Agron. 101 | 3(2-2, 1) |
| Military Science A-III | |
| Mil. Tr. 103 | 1(0-4) |
| Physical Education M-III | |
| Phys. Ed. 105 | R(0-2) |

SECOND SEMESTER

| | |
|---------------------------|-----------|
| Quantitative Analysis I | |
| Chem. 150 | 2(0-6) |
| Pathogenic Bacteriology I | |
| Bac. 111 | 4(2-6) |
| Anatomy II | |
| Anat. 106 | 7(3-12) |
| Forage Crop Production | |
| Agron. 102 | 3(2-2, 1) |
| Agricultural Journalism | |
| Ind. Jour. 164 | 1(1-0) |
| Military Science A-IV | |
| Mil. Tr. 104 | 1(0-4) |
| Physical Education M-IV | |
| Phys. Ed. 106 | R(0-2) |

JUNIOR

FIRST SEMESTER

| | |
|--------------------|---------|
| Embryology | |
| Zoöl. 117 | 3(2-3) |
| Anatomy III | |
| Anat. 111 | 5(1-12) |
| Histology I | |
| Path. 101 | 3(1-6) |
| General Entomology | |
| Ent. 101 | 3(2-3) |
| Electives† | 3 |

SECOND SEMESTER

| | |
|-----------------------|--------|
| Principles of Feeding | |
| An. Husb. 152 | 3(3-0) |
| Anatomy IV | |
| Anat. 116 | 3(1-6) |
| Histology II | |
| Path. 106 | 3(1-6) |
| Electives† | 7 |

* This curriculum is so arranged that students may receive the degree of Bachelor of Science (in agriculture) at the end of four years, and the degree of Doctor of Veterinary Medicine at the end of two more years.

† Six semester credit hours of junior electives must be chosen from the work offered by the departments of history, economics, education, modern languages, or mathematics.

SENIOR

| FIRST SEMESTER | | SECOND SEMESTER | |
|--------------------------|--------|----------------------------|-----------|
| Genetics | | Agricultural Relationships | |
| An. Husb. 221..... | 3(3-0) | Gen. Agric. 201..... | 1(1-0) |
| Comparative Physiology I | | Soil Fertility | |
| Anat. 121 | 5(4-3) | Agron. 132 | 3(2-2, 1) |
| Soils | | Comparative Physiology II | |
| Agron. 131 | 4(3-3) | Anat. 126 | 3(2-3) |
| Agricultural English | | Materia Medica I | |
| Engl. 137 | 3(3-0) | Surg. 151 | 2(2-0) |
| Electives | 1 | Electives | 7 |

FIFTH YEAR

Junior year of the Curriculum in Veterinary Medicine

SIXTH YEAR

Senior year of the Curriculum in Veterinary Medicine

Agricultural Economics

Professor ————
Associate Professor GRIMES*

Associate Professor GREEN
Instructor EVANS

The realization of a more profitable agriculture depends as much upon the utilization of sound business principles, management and methods as upon the practice of technical knowledge emphasized in other departments of an agricultural college. The business side of farming deals essentially with two important groups of forces and conditions, which may be classified, on the one hand, as those centering about the individual and his particular farm, while on the other hand are those having to do largely with group activities and relationships operating from within the locality as well as from outside regions. Local, state, and Federal governments in their relations to farmers, middlemen and consumers have a definite part in programs of modern agriculture. The farmer makes relatively large or small profits according to the degree of his personal efficiency in the organization and management of the farm and the marketing of its products. The courses in this department are therefore designed to equip the student with principles and facts, and the habits of clear thinking which will lead to more efficient and profitable farming both for the individual and for the community.

The department engages not only in teaching, but also conducts investigations of the various economic problems of agriculture. A number of studies have been completed, others are being conducted, and many more are contemplated for the future. These studies provide ample material for class work and present opportunities for advanced students to engage in original investigation and research. Farm credit, tenancy, the marketing of farm products, and other subjects, together with special farm-management investigations, center the student's attention on facts which are up to date and of vital importance to those who desire to make their farming profitable and interesting.

Farm-management studies have been made in many parts of the state, and are being extended each year. These studies of the farm business furnish abundant material for class and laboratory work, and give an excellent knowledge of the business problems of individual farmers in the various parts of the state. A number of the more successful farms of the state are visited by the students in the advanced courses in farm management. These farms furnish the student an opportunity to study the personality of the farmer as well as his business methods and results.

COURSES IN AGRICULTURAL ECONOMICS

FOR UNDERGRADUATES

101.† AGRICULTURAL ECONOMICS. Sophomore year, first semester. Class work, three hours. Three semester credits. Prerequisite: Sophomore standing. Professor ———, Associate Professor Grimes, and Associate Professor Green.

* Absent on leave, 1921-'22.

† For an explanation of the system used in numbering courses, see the paragraph on "Course Numbers," given elsewhere in this catalogue.

The course in agricultural economics undertakes to familiarize the student with the economic principles and forces with which every farmer must deal. It is essential that the farmer know how to produce farm products by the best methods, and it is equally essential that he understand the economic forces which affect the returns from the use of facilities for production which he has at his command. Texts: Taylor's *Agricultural Economics* and Ely and Wicker's *Elementary Principles of Economics*.

106. FARM MANAGEMENT. Elective, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Ag. Ec. 101, Agron. 131, and An. Husb. 152. Associate Professor Grimes and Mr. Evans.

The economic factors affecting the organization and operation of the farm business are studied with respect to their effect on the profits from farming enterprise. Discussions and problems are confined chiefly to the economic problems of the individual farmer on his farm. Methods of leasing are studied in their effect upon the opportunities of the tenant and the landlord. Results from actual farms are studied in the laboratory to give the student opportunity to observe the effects of the various economic factors in their influence on the farm business.

111. FARM COST ACCOUNTING. Elective, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Ag. Ec. 101. Associate Professor Grimes and Mr. Evans.

Various systems of farm records and accounts are studied to acquaint the student with the more practical methods. The principles of cost finding as applied to agricultural enterprises are given. The laboratory work affords opportunity to work out problems from actual farms in which these principles are involved. Particular attention is given to determining the cost of producing farm products and to the analysis and utilization of cost of production data.

FOR GRADUATES AND UNDERGRADUATES

202. MARKETING OF FARM PRODUCTS. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Ag. Ec. 101. Associate Professor Green.

The course is a study of present market organization, methods of buying and selling, costs of marketing, the operation of exchanges, future trading, price control, coöperative selling and buying, foreign trade in farm products, foreign exchange as related to marketing of farm products, and the general fundamental principles of marketing. Texts: Weld's *The Marketing of Farm Products* and Cherington's *Elements of Marketing*.

206. ADVANCED FARM MANAGEMENT. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Ag. Ec. 106. Associate Professor Grimes.

The factors affecting the successful organization and operation of the farm business are studied by visiting farms in various parts of the state. The effects of external factors are also observed. A number of the better and more profitable farms in Kansas are visited during the course.

211. AGRICULTURAL INDUSTRIES. Elective, second semester. (Not offered in 1921-'22; alternates with Ag. Ec. 212.) Class work, two hours. Two semester credits. Prerequisite: Ag. Ec. 101. Dean Farrell.

This course deals with some of the more important phases of agriculture from the standpoint of their industrial requirements and relationships. Consideration is given to the principal geographic, economic, and social factors involved in the establishment and maintenance of the world's leading agricultural industries. The course is designed pri-

marily to fit students to make an agricultural reconnaissance either in a settled or unsettled region; to determine what agricultural industries are suitable for a region; and to devise methods of establishing new agricultural industries or of improving industries already established. The course consists of lectures, reference work, assigned topics, and discussions.

212. CONSERVATION OF AGRICULTURAL RESOURCES. Elective, second semester. (Not offered in 1922-'23; alternates with Ag. Ec. 211.) Class work, two hours. Two semester credits. Prerequisite: Ag. Ec. 101. Open to juniors, seniors, and graduates only. Dean Farrell.

This course deals with several of the world's more important natural resources, as such, particularly those directly concerned with agriculture and the welfare of the agricultural community. Consideration is given to such matters as the size, location, and importance of these resources, their relationships to present and prospective conditions, their bearing in local, state, national, and international policies, and the place they should occupy in public opinion and citizenship. The course consists of lectures, reference work, assigned topics, and discussions.

217. AGRICULTURAL LAND PROBLEMS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Ag. Ec. 101. Associate Professor Green.

This course includes a study of the ownership of land, the land policies of various important governments, state aid in land settlement, the Australian state-aided settlements, the California land-settlement act, land taxation, and the Torren's system of registration in land transfer. Text: Mead's *Helping Men Own Farms*.

221. AGRICULTURAL FINANCE. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Ag. Ec. 101. Associate Professor Green.

Studies are made of the organization of agricultural land credit and short-time rural credit, the coöperative credit systems of Europe and other countries, the Federal farm-loan act of the United States, coöperative insurance societies, and the problems of financing landowners, tenants, and farm laborers. Text: Morman's *Principles of Rural Credits*.

226. AGRICULTURAL ECONOMIC PROBLEMS. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Ag. Ec. 101. Associate Professor Grimes and Associate Professor Green.

Problems of a more advanced nature than those considered in the first course in agricultural economics are taken up. These include the problems of intensity of culture, national agricultural policies, international agricultural relationships, agricultural legislation, agricultural labor, some phases of coöperative endeavor, and other agricultural economic problems.

231. AGRICULTURAL ECONOMICS SEMINAR. Elective, second semester. Class work, one hour. One semester credit. Prerequisite: Ag. Ec. 101. Associate Professor Grimes.

Current publications dealing with timely agricultural economic subjects are reviewed and discussed by the students.

FOR GRADUATES

301. RESEARCH IN AGRICULTURAL ECONOMICS. Elective, both semesters and summer school. One to five semester credits. Prerequisites: Consult instructors. Associate Professor Grimes, Associate Professor Green, and Dean Farrell.

This course involves individual research problems in the marketing of farm products, coöperation among farmers, land problems, tenancy, agricultural industries, agricultural finance, farm labor, farm power, farm organization, and the cost of producing farm products. Any of the subjects assigned may furnish data for a master's thesis.

Agronomy

Professor CALL
 Professor SALMON
 Professor THROCKMORTON
 Associate Professor PARKER
 Associate Professor HENSEL
 Associate Professor SEWELL

Assistant Professor ZAHNLEY
 Assistant Professor LAUDE
 Assistant DALE
 Assistant HARLING
 Assistant LYONS
 Assistant PHINNEY

The College farm used by the Department of Agronomy comprises 320 acres of medium rolling upland soil, well suited to experimental and demonstration work. It is well equipped with all kinds of farm machinery necessary in crop production. The general fields and experimental plots used for the breeding and testing of farm crops, and for conducting experiments in soil fertility and methods of culture, afford the student excellent opportunities for study and investigation.

Large and well-equipped laboratories for soil and crop work are maintained for the regular use of students. Material is provided for the study of the grain and forage crops best adapted to different purposes and most suitable for growing in the state. Ample greenhouse space is provided for problems and research work in crops and soils.

The Department of Agronomy offers courses in cereal and forage crop production and improvement, in pasture management, in soils, soil fertility, soil survey, and dry-land farming.

COURSES IN FARM CROPS

FOR UNDERGRADUATES

101. GRAIN CROP PRODUCTION. Sophomore year, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Bot. 101. Associate Professor Parker and Assistant Professor Zahnley.

This course is a study of the distribution, relative importance, and production of grain crops, including wheat, corn, oats, barley, rye, rice, buckwheat, and flax.

102. FORAGE CROP PRODUCTION. Sophomore year, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Bot. 101. Assistant Professor Zahnley.

This course is a study of the distribution, relative importance, value, and production of forage crops, including sorghums, alfalfa, clover, and the grasses.

103. FARM CROPS. Sophomore year, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Assistant Professor Zahnley.

This course consists of a study of the more important grain and forage crops, especially from the production viewpoint.

105. SEED IDENTIFICATION AND WEED CONTROL. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Agron. 101 and 102. Assistant Professor Zahnley and Mrs. Harling.

Methods of propagation, control, and eradication of weeds are discussed in lectures. The laboratory period is devoted to the identification of weed plants, and seeds; to germination and purity testing; and to field trips.

107. **SPECIAL CROPS.** Elective, second semester. Class work, two hours. Two semester credits. Prerequisites: Agron. 101 and 102. Assistant Professor Zahnley.

The distribution, climatic and soil requirements, relative importance, and production of sugar beets, cotton, flax for fiber, hemp, tobacco, and other minor crops are studied.

FOR GRADUATES AND UNDERGRADUATES

201. **CROP IMPROVEMENT.** Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Agron. 101 and 102, and An. Husb. 221. Associate Professor Parker.

This course reviews the principles of plant breeding and applies them to the principal groups of field crops. Methods of selection, hybridization, and breeding for special qualities are discussed. Laboratory work is a study of heritable characters and of their behavior in several generations following the cross.

202. **ADVANCED GRAIN CROPS.** Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 101. Professor Salmon.

Special phases of grain crop production are discussed in class. The laboratory work is devoted largely to identification and judging of threshed grain.

203. **ADVANCED FORAGE CROPS.** Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite, Agron. 102. Assistant Professor Zahnley.

Results of the most recent investigations carried on with forage crops in this and in other countries are studied, together with a more intensive study of the sorghums, alfalfa, sweet clover, soybeans, and other important or promising forage crops.

Laboratory.—The laboratory work is devoted to a study of the growth habits of the crops considered in the lecture, especially as they are related to the production and improvement of these crops. Storing, market grading, and marketing of hay are also considered.

205. **PRINCIPLES OF AGRONOMIC EXPERIMENTATION.** Elective, first semester. Class work, one hour. One semester credit. Prerequisites: Agron. 201 and 132. Professor Salmon.

A discussion of the principles of experimentation in general is followed by their application to agronomic problems. Important contributions to agronomic science are studied from the historical viewpoint.

206. **AGRONOMY SEMINAR.** Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Agron. 101, 102, and 131. Professor Call.

In this course students are required to review before the class timely articles appearing in bulletins and current periodicals.

207. **PASTURE MANAGEMENT.** Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Bot. 102 and Agron. 102. Associate Professor Hensel.

This course will be taken up in two parts: First, native forage plants, their distribution, value, life history and habits, and their management. Second, management of pastures and ranges, including the determination of carrying capacity, character of stock best suited to a range or pasture and the proper methods of handling areas to maintain or increase the forage cover.

208. PLANT GENETICS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: An. Husb. 221. Associate Professor Parker.

This course is an advanced course in genetics and is offered to those students interested in plant breeding. Lectures and reference reading will deal with fundamental principles of breeding as they have been worked out in plants.

209. GENETICS SEMINAR. Elective, first and second semesters. One semester credit. (For prerequisites, consult instructors.) Professor Lippincott, Professor Nabours, Associate Professor Parker, and Assistant Professor Ibsen.

This course continues through the first and second semesters and includes the study and criticism of genetic experiments in plants and animals, the biological and mathematical methods employed, and the validity of conclusions drawn.

210. CROP PROBLEMS. Elective, both semesters and summer school. Laboratory, three to twelve hours. One to four semester credits. Prerequisites: Agron. 202 and 203. Professor Salmon and Associate Professor Parker.

Students choose or are assigned special problems for study. The completion of the work with a written report entitles them to credit according to the amount and quality of the work done.

FOR GRADUATES

301. CROPS RESEARCH. Elective, both semesters and summer school. Laboratory, three to fifteen hours. One to five semester credits according to the work done. Prerequisites: Agron. 202 and 203. Professor Salmon and Associate Professor Parker.

Students choose or are assigned special problems which may furnish data for a master's thesis. The completion of the work entitles them to credit according to the amount of work done.

302. PASTURE MANAGEMENT RESEARCH. Elective, both semesters and summer school. One to five semester credits, depending on the work done. Prerequisites: Agron. 207, Civ. Eng. 111, Bot. 223 and 225. Associate Professor Hensel.

Students choose or are assigned special problems for investigation. The investigations may furnish data for a master's thesis.

COURSES IN SOILS

FOR UNDERGRADUATES

131. SOILS. Junior and senior years, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: Chem. 102 or 108. Professor Call, Professor Throckmorton, Associate Professor Sewell, and Mr. Lyons.

This course deals with the origin and formation of soils and their classification and composition as influenced by method of formation and climatic condition. Special attention is given to the management of soils required to conserve moisture and liberate plant food.

132. SOIL FERTILITY. Junior and senior years, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Chem. 150 and Agron. 131. Professor Call, Professor Throckmorton, Associate Professor Sewell, and Mr. Lyons.

Factors influencing the fertility of the soil, the effect of different systems of farming on soil fertility, and management of the soil to conserve its fertility receive most attention in this course.

FOR GRADUATES AND UNDERGRADUATES

231. DRY-LAND FARMING. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Agron. 131. Professor Throckmorton.

The principles underlying the cultivation methods and farming systems under light rainfall conditions are studied.

232. ADVANCED SOIL FERTILITY. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 132. Professor Throckmorton.

This course deals with the use of commercial fertilizers and their effects upon plants and soil.

233. SOIL SURVEY. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 131. Professor Throckmorton.

Types of soils of the United States and methods of mapping soil areas are studied in this course. Special attention is given to the study of Kansas soils in the field.

234. SOIL MANAGEMENT. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 132. Professor Throckmorton.

This course deals with the management of soils under irrigation and with the management of wet, sandy, and eroded soils and with other types requiring special methods of working.

235. ADVANCED SOILS LABORATORY. Elective, first and second semester, or both. One to four semester credits, according to the amount of work done. Prerequisite: Agron. 132. Professor Throckmorton and Mr. Lyons.

This course deals with the more advanced problems of soil physics and fertility and includes the making of mechanical analyses, the determination of moisture equivalent, specific heat, and pot work with soils in the greenhouse.

236. SOIL PROBLEMS. Elective, both semesters and summer school. Laboratory, three to twelve hours. One to four semester credits. Prerequisites depend on the problem given. Professor Call, Professor Throckmorton, and Associate Professor Sewell.

Students choose or are assigned special problems in soils.

FOR GRADUATES

331. SOIL RESEARCH. Elective, both semesters and summer school. One to five semester credits, according to the work done. Prerequisites: Agron. 132 and Chem. 150. Professor Call, Professor Throckmorton, and Associate Professor Sewell.

Students are assigned special soil problems, which may extend throughout the year and furnish data for a master's thesis.

Animal Husbandry

Professor McCAMPBELL
Associate Professor PATERSON
Associate Professor BELL
Assistant Professor IBSEN
Assistant Professor WINCHESTER
Assistant Professor ANDERSON

Assistant Professor AUBEL
Instructor MACKINTOSH
Assistant _____
Assistant _____
Fellow MARSTON
Fellow HORLACHER

The Department of Animal Husbandry owns 400 acres of land, and rents 256 acres for the maintenance of herds and flocks of pure-bred horses, cattle, sheep, and hogs. The College live stock has attained a national reputation among breeders and feeders on account of the many prize-winning animals produced.

The feed yards and barns are well arranged for experimental feeding and the maintenance of the herds. The laboratory of the animal husbandry student is, as a matter of fact, the feed yard and the animal. He studies the animal from the standpoint of the breeder and of the feeder. He learns to combine the needs of each and to find these qualities exemplified in the perfect animal.

The courses of study in this department are arranged to give the student special instruction in the selection, breeding, feeding, marketing, and management of all classes of live stock.

COURSES IN ANIMAL HUSBANDRY

FOR UNDERGRADUATES

131. MARKET GRADES AND CLASSES OF LIVE STOCK. Freshman year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Associate Professor Paterson, Assistant Professor Anderson, Assistant Professor Aubel, Instructor Mackintosh, and Fellow Horlacher.

This course consists of a study of correct conformation and quality of the different market grades and classes of live stock. Text: Vaughn's *Types and Market Classes of Live Stock*.

Laboratory.—Practice is given in scoring and comparing market animals.

134. TYPES AND CLASSES OF LIVE STOCK (Vet.). Sophomore year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Associate Professor Paterson.

One-fourth of this course is given by members of the Dairy Husbandry Department. A study is made of the market types and classes of horses, beef cattle, dairy cattle, sheep, and swine. Text: Vaughn's *Types and Market Classes of Live Stock*.

Laboratory.—Practice is given in scoring and judging market animals.

137. BREEDING TYPES AND CLASSES OF LIVE STOCK. Sophomore year, second semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 131. Associate Professor Paterson, Assistant Professor Aubel, and Mr. Mackintosh.

This course consists of a study of the breeding types and classes of horses, cattle, sheep, and swine. Text: Plumb's *Types and Breeds of Farm Animals*.

140. ADVANCED STOCK JUDGING I. Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 137. Associate Professor Bell.

This course deals with the judging of market classes as well as with all different breeds of pure-bred stock. The stock is judged in groups of from four to six animals in the same manner as is customary at county or state fairs.

143. **ADVANCED STOCK JUDGING II.** Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 140. Associate Professor Bell.

This is a continuation of An. Husb. 140. During the work of the semester occasional trips are made to the best live-stock farms of the state, where the students have an opportunity to judge and to observe the management of herds and flocks as handled by the most successful stockmen of the state.

146. **FORM AND FUNCTION IN LIVE STOCK.** Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 143. Associate Professor Bell.

A detailed and specific study is made of animal form and type, and influence of type upon function; also of the relation of form, type and condition to growth and development. Comparative measurements are taken of growing and fattening animals, speed and draft horses, mutton and wool sheep, and lard and bacon types of hogs. Special training is given in presenting orally the relative merits of animals of all breeds.

149. **HISTORY OF BREEDS AND PEDIGREES.** Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: An. Husb. 131. Mr. Mackintosh.

A study is made of the early history and development of pure-bred domestic animals; also a sufficient study of herdbooks and pedigrees to acquaint students with the leading strains and families of the different breeds of horses, cattle, sheep, and swine. Text: Plumb's *Types and Breeds of Farm Animals*.

152. **PRINCIPLES OF FEEDING.** Sophomore and junior years, second semester. Class work, three hours. Three semester credits. Prerequisites: Anat. 131, and Chem. 120. Assistant Professor Winchester.

This course involves a study of the digestive system and the processes of nutrition, the origin, chemical analysis, grades, and feeding values of different feeds, and of the theory of practical economy of rations, both for the maintenance and for the fattening of all classes of farm animals.

155. **BEEF CATTLE PRODUCTION.** Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 137, 140, 149, and 152. Professor McCampbell, and Assistant Professor Aubel.

This course includes the study of economical methods of growing and fattening market cattle and up-to-date methods of breeding, developing, fitting, and marketing pure-bred beef cattle. The laboratory includes practice in feeding, management, and housing of cattle.

158. **SWINE PRODUCTION.** Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 137, 140, 149, and 152. Associate Professor Bell.

This course comprises a systematic study of economical methods of growing, fitting, and finishing swine both for breeding purposes and for the market. The laboratory work includes practice in feeding, management, and housing of swine.

161. **SHEEP PRODUCTION.** Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 137, 140, 149 and 152. Associate Professor Paterson.

A systematic study is made of economic methods of growing, fitting, and finishing sheep both for breeding purposes and for market. The laboratory work includes practice in feeding, management, and housing of sheep.

164. HORSE PRODUCTION. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 137, 140, 149 and 152. Assistant Professor Anderson.

This course includes a study of economic methods of growing, handling, and housing horses for breeding purposes, for work, and for the market. The laboratory work includes practice in feeding, handling, and housing horses.

167. MEATS. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: An. Husb. 137 and 152. Associate Professor Paterson.

This is a course in killing, and in dressing, cutting, and curing meats.

170. TEACHERS' COURSE IN ANIMAL HUSBANDRY. Elective, summer school. Class work, six hours; laboratory, six hours. Four semester credits. Professor McCampbell.

This course is planned to give a general review of the live-stock industry, with the purpose of encouraging a better standard of teaching animal husbandry in secondary schools. The course includes work in feeding, breeding, management, and history of the various breeds of live stock.

FOR GRADUATES AND UNDERGRADUATES

221. GENETICS. Junior year, first semester. Class work, three hours. Three semester credits. Prerequisites: Zoöl. 105, and Bot. 105. Assistant Professor Ibsen.

This course embraces a general discussion of variation, Mendelian inheritance, and related subjects.

223. ANIMAL BREEDING. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: An. Husb. 221. Assistant Professor Aubel.

This course embraces a study of the physiology of reproduction; general principles of heredity; variation; systems of mating; influence of pedigrees and herdbook standards; and an analysis of the breeding practices of leading breeders.

225. ADVANCED GENETICS. Elective, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisites: An. Husb. 221. Assistant Professor Ibsen.

Particular attention is given to the relation of the chromosomes to heredity. The subject as a whole is studied in greater detail than in An. Husb. 221.

227. GENETICS SEMINAR. Elective, first and second semester. One semester credit. (For prerequisites, consult instructors.) Professors Nabours, Lippincott, Ibsen, and Parker.

This course continues through the first and second semesters and includes the study and criticism of genetic experiments in plants and animals, the biological and mathematical methods employed, and validity of conclusions drawn.

229. RESEARCH IN GENETICS. Elective, first and second semesters. Four to ten semester credits. Prerequisite: An. Husb. 225. Assistant Professor Ibsen.

This course continues through the year and offers opportunity for individual study of problems in which small mammals are used as the experimental animals.

231. **ADVANCED STUDIES IN PEDIGREES.** Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: An. Husb. 149. Mr. Mackintosh.

This course consists of a careful study of the pedigrees and the prepotency of individuals representing the more important strains and families of beef cattle, horses, sheep, and swine.

233. **ADVANCED FEEDING.** Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: An. Husb. 152. Assistant Professor Winchester.

This course consists of a survey of the experimental feeding of horses, cattle, sheep, and hogs, together with a study of the fundamental and practical feeding problems of the various sections of the country. Emphasis is placed upon the results obtained in the experimental investigation of these problems.

235. **ADVANCED MEATS.** Elective, second semester. Two to four semester credits. Prerequisite: An. Husb. 167. Associate Professor Paterson.

This course includes grading of carcasses, studies in nutritive values of different grades of meats, factors influencing the quality of meats, factors influencing dressing percentage of meat animals, and the identification of meats from different animals.

237. **THE WOOL INDUSTRY.** Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: An. Husb. 161. Associate Professor Paterson.

This course includes a study of the supply of wool and the demand for it, and the method of producing, marketing, storing, grading, and manufacturing wool.

239. **SYSTEMS OF LIVE-STOCK PRODUCTION.** Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: An. Husb. 155, 158, 161, and 164. Professor McCampbell.

This course includes a study of the relation of live-stock production to agriculture. It also includes a study of management, climate, soil, topography, location of markets, land, labor, capital, and managing ability as factors influencing the choice and adaptation of systems of production.

241. **LIVE-STOCK MARKETING.** Elective, second semester. Class work, two hours. Two semester credits. Prerequisites: An. Husb. 155, 158, 161, and 164. Professor McCampbell and Assistant Professor Winchester.

This course includes a study of the art of marketing live stock and live-stock products; freight and insurance rates in transit, liability of carrier and shipper, terminal charge, etc.; commissions for sale of storage; the relation of market prices of grain and hay to contemporary values of live-stock meat.

244. **ANIMAL HUSBANDRY SEMINAR.** Elective, second semester. Open to seniors and to graduates only. Class work, one hour. One semester credit. Prerequisite: An. Husb. 152. Assistant Professor Winchester.

FOR GRADUATES

301. **RESEARCH IN ANIMAL HUSBANDRY.** Elective, first and second semesters. Prerequisites: An. Husb. 155, 158, 161, and 164. Six to sixteen semester credits. Professor McCampbell.

Students are assigned special problems for investigation in beef cattle production, swine production, sheep production, horse production, pure-bred live-stock production and genetics.

Dairy Husbandry

Professor FITCH
Associate Professor CAVE
Assistant Professor MANEY

Instructor BECKER
Assistant MCGILLIARD

The College dairy farm, including the building and yards, consists of 160 acres of medium upland. This land is used for growing corn, alfalfa, and other crops, such as cowpeas, field peas, and sorghum, and for the pasture of the dairy herd.

The barn is built on the most approved model for the housing of dairy cattle, and is light, well-ventilated, and sanitary, with stalls for 110 cows. Four silos of modern type, feed rooms, a milk room, and a laboratory, exist in connection with the barn. Each of these illustrates some especially desirable feature in dairy building construction.

The dairy herd consists of excellent types of the four dairy breeds: Jersey, Guernsey, Ayrshire, and Holstein. These animals are pure bred, and a number have been entered in the advanced registry of their respective breeds. The excellence of the dairy herd is shown by the yearly records of the cows in the herd that have been officially tested. The average for the Guernseys is 8,717 pounds of milk and 425 pounds of butter fat; for the Ayrshires, 11,805 pounds of milk and 454 pounds of butter fat; for the Holsteins, 14,777 pounds of milk and 491 pounds of butter fat, and for the Jerseys, 9,176 pounds of milk and 484 pounds of butter fat. Maid Henry, a thirteen-year-old Holstein, produced 19,000 pounds of milk, yielding 715 pounds of butter fat in one year. Carlotta Empress Fobes, a four-year-old Holstein, produced 24,550 pounds of milk and 692 pounds of butter fat in one year. This is the highest milk record in the state. Imp. Lucy 2d of Corbinez, a pure-bred Guernsey, has a record of 11,261 pounds of milk and 556 pounds of butter fat in one year. Canary Bell, an Ayrshire, produced in one year 19,863 pounds of milk, containing 744 pounds of butter fat, which is equivalent to 930 pounds of average butter, 80 per cent fat. This is the highest record ever made in Kansas. Melrose Canary Bell, a daughter of Canary Bell, was the highest tested junior two-year-old for the Ayrshire breed in 1917. Canary Bell was the highest tested mature Ayrshire in the United States during 1918. Bangora's Melrose was the highest tested senior three-year-old for the same year, with 14,515 pounds of milk and 568 pounds of butter fat. Owl's Design is the highest record Jersey in the state, with her record of 14,606 pounds of milk and 650 pounds of butter fat.

In the students' national dairy judging contests, the students specializing in dairying from the Kansas State Agricultural College have always been placed high. In 1919 the team from this institution won first place in this contest, in competition with judging teams from fifteen other agricultural colleges. In 1920 the team from the Kansas State Agricultural College again won first place, this time in competition with teams from twenty other agricultural colleges. The Kansas team had the high individual of the contest and the high individual on judging Jersey cattle. It was also first team in judging Jerseys and Holsteins.

The high man on Jerseys won a 400-dollar scholarship offered by the American Jersey Cattle Club.

The dairy building houses the creamery, the cheese rooms, the classrooms, and the offices, and the necessary laboratories for testing and hand-separator work. Refrigeration is secured from a refrigerating machine and ice plant installed in the building. These facilities of barn, herd, and laboratories are in constant use by the students of dairying. The instruction in dairy husbandry includes the study of the selection and breeding of dairy animals, the production of milk, its manufacture into butter, cheese, and other dairy products, or its sale on the market.

COURSES IN DAIRY HUSBANDRY

FOR UNDERGRADUATES

101. ELEMENTS OF DAIRYING. Freshman year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Professor Fitch, Assistant Professor Maxey, Mr. Becker and Mr. McGilliard.

This is a general course in dairying, dealing with the secretion, composition and properties of milk, with the factors influencing the quantity and quality of milk, and with care of milk and cream on the farm. It includes a study of the different methods of creaming, the construction and operation of farm separators, the principles and application of the Babcock test, the use of the lactometer, and butter making on the farm. Lectures supplemented by text, Stocking's *Manual of Milk Products*.

Laboratory.—Practice is given in operating the Babcock test and lactometer, separation of milk, and farm butter making.

102. TYPES AND CLASSES OF LIVE STOCK (VET). Sophomore year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Associate Professor Cave.

One-fourth of this course, which is described more fully under the Department of Animal Husbandry, is given by members of the Department of Dairy Husbandry, and comprises the judging and scoring of dairy cattle.

104. DAIRY JUDGING. Freshman year, first and second semesters. Laboratory, three hours. One semester credit. Associate Professor Cave, Mr. Becker, and Mr. McGilliard.

This course calls for the judging of dairy stock from the standpoint of economical production and breed type. Score cards are used for the purpose of training the student to become accurate, thorough and systematic in the selection of animals as representatives of breeds or for breeding purposes. No textbook is required. *Types and Breeds of Farm Animals*, by C. S. Plumb, and Breeder's Association literature are used as references.

106. DAIRY INSPECTION I. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Bact. 106, Chem. 254, and Dairy Husb. 101. Assistant Professor Maxey.

Advanced work is given in the testing of dairy products, including testing for adulterations. Practice is given in the use of score cards for inspecting and grading milk depots, dairy farms, and creameries. The course is designed to give training in the duties of a city, state, or government inspector or commissioner. State and city ordinances governing the handling and public sale of dairy products are outlined. Text: Farrington and Woll's *Testing Milk and Its Products*.

108. MILK PRODUCTION. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Dairy Husb. 101 and An. Husb. 152. Professor Fitch.

This course deals with the economical production of milk and with the most approved method of handling the dairy herd, also the construc-

tion of dairy barns and buildings, and other subjects which relate to the dairy farmer.

110. BUTTER MAKING AND CREAMERY MANAGEMENT. Electives, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Dairy Husb. 101 and Bact. 211. Assistant Professor Maxey.

This course comprises a study of the principles of creamery butter making, the construction and care of creameries and their appliances, methods of sampling and grading cream, pasteurization, starter making, cream ripening, and creamery accounting. Text: Guthrie's *The Book of Butter*.

Laboratory.—Practice is given in the sampling and grading of milk and cream; in separating and ripening cream; in the preparation and use of the starter in pasteurized and in raw cream; in churning; in working, washing, salting, and packing butter; and in keeping complete records of each operation. The work also includes the making of salt, fat, and moisture determinations of the finished product, and judging and scoring butter.

112. HOME DAIRYING. Elective, last half of second semester. Class work, two hours; laboratory, three hours. One and one-half semester credits. Associate Professor Cave.

This course includes a study of the composition of milk, Babcock testing, separation of milk, cream ripening, and farm butter making; also a brief study of the breeds of dairy cattle. It is given with the elective course, Poult. Husb. 102, which is offered the first half of the second semester.

114. CHEESE AND ICE-CREAM MAKING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Chem. 254, Bact. 211, and Dairy Husb. 101. Assistant Professor Maxey.

This course includes the making of cheese on the farm for home use and for sale, and the commercial manufacture of Cheddar cheese, comprising each detail from the receipt of the milk to the marketing of the finished product. The cheese work is given the first half of the semester; the manufacture and handling of ice cream and ices for the retail and wholesale trade in the second half. Text: Van Slyke-Publow's *The Science and Practice of Cheese Making*.

Laboratory.—Practice is given in making cheese under farm conditions and on a commercial scale. Records are kept of the different operations and their influence upon the finished product is noted. Exercises are given in testing, judging and scoring cheese. The latter half of the semester is devoted to the making of ice cream and ices.

116. MARKET MILK. Elective, first semester. Lecture, one hour; laboratory, three hours. Two semester credits. Prerequisites: Dairy Husb. 101 and Bact. 211. Assistant Professor Maxey.

This course includes a study of the classes of market milk (certified, inspected and pasteurized, also other classifications), equipment and methods for clean milk production, and the relation of clean milk to producer, dealer, and consumer. Also systems of milk inspection, score cards, and milk and cream contests. Lectures are also given on milk plants, including their methods and equipment, such as receiving, storing, separating, removing sediment, pasteurization, bottling and capping, cleaning and sterilizing bottles and cans, the use of homogenizer and emulser and practical laboratory methods of examining milk.

Laboratory.—The work includes actual practice in all the steps in the production of market milk and cream in the College milk plant.

118. DAIRY INSPECTION II. Senior year, second semester. Laboratory, three hours. One semester credit. Assistant Professor Maxey.

This course comprises the testing of dairy products, the inspection and

scoring of dairies and milk depots, and the testing for adulterants in dairy products. Text: Farrington and Woll's *Testing Milk and Its Products*.

120. ADVANCED DAIRY JUDGING. Elective, second semester. Laboratory, three hours. One semester credit. Associate Professor Cave.

This course is a continuation of Dairy Husb. 104. Visits are made to the best farms in the state and students are given an opportunity to judge and to handle stock kept by the most successful breeders.

FOR GRADUATES AND UNDERGRADUATES

202. DAIRY SEMINAR. Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Dairy Husb. 101, 106, and 108. Professor Fitch.

This course includes a study and review of dairy periodicals and experiment station bulletins, books and other dairy literature.

203. DAIRY HERD MANAGEMENT. Elective, second semester, senior year. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Dairy Husb. 108. Professor Fitch and Associate Professor Cave.

This course is an advanced course in the feeding and management of the dairy herd. It takes up the study of pedigrees, feeding and management of advanced registry cows, the fitting of animals for show and sale, and other subjects pertaining to the management of dairy herds.

Reference Texts: Larson and Putney's *Dairy Cattle Feeding and Management*, and Eckles' *Dairy Cattle and Milk Production*.

FOR GRADUATES

301. DAIRY RESEARCH. Elective, both semesters. By appointment. Three semester credits. Prerequisites: Dairy Husb. 108 and 110. Professor Fitch.

This course gives credit on special problems assigned to students.

General Agriculture

Dean FARRELL

FOR UNDERGRADUATES

101. AGRICULTURAL LECTURES. Freshman year, first semester. Lectures, one hour a week. Deans of the Divisions of Agriculture, Veterinary Medicine, Extension, and the Summer School, and heads of departments in the Agricultural Experiment Station.

These lectures are designed to inform freshmen regarding the prospective opportunities for those who prepare themselves for service in the various fields of work open to agricultural students, and regarding the requirements for success in those fields.

FOR GRADUATES AND UNDERGRADUATES

201. AGRICULTURAL RELATIONSHIPS. Senior year, second semester. Class work, one hour. One semester credit. Open to seniors in agriculture, to graduates only. Dean Farrell.

This course is designed for agricultural students who are about to enter upon their life work. It is given for the purpose of directing the attention of these students to their duties, responsibilities, and opportunities for service as citizens of the agricultural community and as specialists in various phases of agricultural activity. It consists of lectures and discussions relating to the broad, fundamental relationships of individual farmers and other agricultural people with each other, and of the agricultural community with other communities. The course places special emphasis in this connection on the responsibilities, obligations, and opportunities of agricultural graduates as American citizens.

Horticulture

Professor DICKENS
Professor BARNETT
Instructor PICKETT

Instructor WIEDORN
Assistant BALCH

A wealth of illustrative material for classes in all horticultural subjects is found in the large collection of species growing upon the College campus, in the orchard plantations, and in the greenhouses.

The horticultural grounds consist of eighty acres of land devoted exclusively to horticultural and forestry work in gardens, nurseries, orchards, and vineyards. A new small-fruit plantation is being developed, in which will be planted all standard varieties of small fruits. A full equipment of garden tools, spraying machinery and accessories, pruning tools, and special apparatus for floriculture is available at all times for the use of students. The College grounds furnish one of the finest and most complete laboratories in the state for the study of landscape gardening.

The instruction in the Department of Horticulture covers plant propagation, pomology, including fruit judging, vegetable gardening, small fruits, spraying, orcharding, greenhouse problems, forestry, and all phases of landscape gardening.

Instruction in landscape gardening is planned to meet the requirements of several classes of students: (1) Students who wish a better understanding of the principles underlying landscape gardening; (2) students who wish to specialize in landscape gardening. A complete course, with the coöperation of the Departments of Civil Engineering and Architecture, is offered the latter students.

COURSES IN HORTICULTURE

FOR UNDERGRADUATES

101. PLANT PROPAGATION. Freshman year, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Bot. 101. Mr. Pickett.

This course includes a discussion of natural and cultural methods of propagation; seeds, seed testing, and seed growing; the treatment required for different kinds of seeds, the production of seedlings for stocks; grafting, budding, layering; the making of cuttings, and the special requirements for propagating commercial fruits and ornamental plants. Text: Bailey's *Nursery Manual*.

Laboratory.—Practical work is given in the preparation of seeds and in seed testing; in the preparation of seed beds, and in the use of seeding machinery; in transplanting, grafting, budding, and in general nursery practice.

105. SYSTEMATIC POMOLOGY. Elective, first semester. Class work, two hours; laboratory, six hours. Four semester credits. Prerequisite: Hort. 107. Professor Barnett.

This course consists of a technical study of fruit varieties, including varietal relationships, and the principles underlying pomological nomenclature, variety description, and both artificial and natural systems of variety classifications. Texts: Waugh's *Systematic Pomology* and Beach's *Apples of New York*.

Laboratory.—In the laboratory actual fruits are studied. These are obtained from many parts of the United States and make possible valu-

able comparisons of varietal variations due to environment. Description, identification, and the preparation of fruit displays are the principal laboratory topics.

107. ORCHARDING. Sophomore year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Hort. 101. Professor Barnett and Mr. Pickett.

This course includes studies of the conditions necessary for success with orchards, including location, improvement of soil, application of fertilizers and cultural methods, and pruning. Spraying and pruning practice are given in the laboratory.

Laboratory.—In the laboratory the student first of all gains acquaintance with all the more common fruit plants and their habit of fruit bearing. Pruning for tree building and for fruit production, the spraying program, fruit-tree judging, observation of cover crops, and apple-fruit descriptions are among the other practical phases of orcharding in which the student gains experience.

110. SMALL FRUITS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Hort. 101. Professor Barnett.

The small fruits of commercial importance are considered with reference to their requirements as to soil, fertilizers, cultivation, and protection. The management of small areas designed to furnish a supply of fruits for home use, and the handling of commercial plantations, are considered. Text: Sear's *Productive Small Fruit Culture*.

113. FARM FORESTRY. Elective, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Professor Dickens.

This course consists of a study of the needs of Kansas farms for windbreaks and wood lots for post and fuel production; also a study of forest conservation and methods of handling timber. The growing of trees in locations better suited for timber than for other crops is considered; also the composition of windbreaks and their value as a protection to home orchards and fields.

Laboratory.—Laboratory work includes identification of species, methods of forming windbreaks, and nursery work in transplanting trees of various sizes and a determination of the rate of growth of trees under various conditions.

116. DENDROLOGY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Dickens.

In this course a study is made of the classification and identification of forest trees, including a study of forest ecology and taxonomy; of the classification of commercial species; the relative importance of timber species; and the life history and requirements of trees.

Laboratory.—The laboratory work consists of studies in the College arboretum and excursions to near-by wood lots. The student is given an opportunity to become acquainted with trees that succeed well in this state.

119. SILVICULTURE. Elective, second semester. Class work, two hours; field work, three hours. Three semester credits. Prerequisite: Hort. 113 or 116. Professor Dickens.

The business of tree growing for timber and economic purposes is studied. Requirements of species, their range and requirements as to soils, climate and the various factors that determine their reproduction and rate of growth are discussed. Protection of forests from fire and insects and the application of various systems of silviculture are given consideration.

122. GARDENING. Sophomore year, second semester. Class work, three hours. Three semester credits. Professor Dickens and Mr. Wiedorn.

It is the purpose of this course in gardening to give young women a working knowledge of and a close acquaintance with the garden as it concerns the home. The first part of the course is concerned with the principles of plant growth, the relation of soils to plants, and the methods necessary for successful work in kitchen gardening, flower beds, window gardening, the requirements of plants in regard to watering, temperatures, hotbeds and the first principles of floriculture.

In the latter part of the course the young women are introduced to the principles of landscape gardening, with particular reference to the problems of home plantings. In conjunction with the lectures, each member of the class is required to prepare plans for town home, farm home and country place, and the classes are required to do group work that will give them an insight into the needs of school grounds. Playgrounds, public parks, and cemeteries are considered and are given a considerable amount of time.

Particular emphasis is placed upon acquaintance with materials that are used for garden purposes. The College campus, gardens, and greenhouses furnish a wealth of material that is best adapted to garden problems and landscape composition.

125. LANDSCAPE GARDENING I (*or* ELEMENTARY LANDSCAPE DESIGN). Elective, second semester and summer school. Class work, two hours; laboratory, six hours. Four semester credits. Mr. Wiedorn.

This is a general course. It is designed to give some knowledge of the variety of problems to be met in the practice of landscape gardening.

Laboratory.—The laboratory work consists of drafting-room work and field trips. A series of problems are given, from the simple arrangement of home grounds to the layout of a country estate or park. Detailed study of selected designs of the leading landscape architects will be made. Special stress will be laid on graphic expression and methods of indication.

128. GREENHOUSE CONSTRUCTION AND MANAGEMENT. Elective, first semester. Class work, three hours. Three semester credits. Mr. Balch.

This course consists of work covering the more important points of greenhouse construction and the proper methods of conducting the greenhouse business. Not only is this subject treated from the commercial standpoint, but the management of private conservatories is also carefully studied.

131. SCHOOL GARDENING. Elective, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Mr. Balch.

The object of this course is to give teachers a knowledge of the principles which underlie success in gardening and the adaptation of small areas to the production of vegetables and flowers. The subjects of soil preparation, seed selection, fertilizers, hotbeds, plant manipulation, and the planning of the garden are given special consideration. Opportunity is given for teachers to become familiar with general garden methods and the use and manipulation of garden tools, including seeders, weeders, and wheel hoes. Allotments of ground areas required for different crops, the length of time required to mature various vegetable and flower crops, the adaptation of these to country and city schools, and suggestions for marketing, are among the subjects considered.

FOR GRADUATES AND UNDERGRADUATES.

201. PRACTICAL POMOLOGY. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Hort. 104. Professor Barnett and Mr. Pickett.

The class work in this course is given by means of lectures and library assignments. It treats of certain practical phases of orcharding which are not given due weight in even the most recent textbooks. These are: Fruit geography, harvesting, grading and packing, storage houses and their management, marketing, and the production of manufactured fruit products.

Laboratory.—The laboratory work consists of field work in the harvesting, grading, and packing of fruits. Several types of mechanical graders are used for demonstrations. Intensive work is given in packing of the various types in boxes and barrels. A thorough study is made of storage practice.

202. SUBTROPICAL POMOLOGY. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Hort. 104. Professor Barnett.

This course is designed to acquaint students of pomology with the geography and methods of production of the principal subtropical fruits which are grown in the United States. The first half of the semester is devoted to the citrus group, and Coit's *Citrus Fruits* is used as a text. Other important fruits, as the fig, the olive, the date, the avocado, the loquat, etc., are studied by means of lectures and assigned readings during the second half of the semester.

205. ADVANCED POMOLOGY. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Hort. 104. Professor Barnett.

The class work in advanced pomology takes up each of the important deciduous tree fruits and considers those points in which its characteristics and production set it apart from the other species. Included are such studies as the taxonomy, morphology, history, statistics of production, climatic range and limits, varietal adaptations, quality and its determining factors, and irrigation of the kinds of fruits under consideration. Lectures and recent bulletins supply the material.

Laboratory.—Advanced apple judging, description and identification of the trees of named varieties, preparation of production graphs, and fruit storage studies are typical of the laboratory work in this course.

208. SPRAYING. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Chem. 102. Mr. Pickett.

The class work consists of lectures on spraying machinery, accessories, and the principal materials used as insecticides and fungicides.

Laboratory.—The laboratory work offers exercise in the preparation and testing of spray materials. Special study is given to the construction of the various types of spray machinery. Nozzles and spray guns are carefully tested.

209. ORCHARD PROBLEMS. Credit determined by instructor. Prerequisite: Hort. 104. Open to seniors only. Professor Dickens.

An opportunity is given students in this course to do investigative work on problems relating to commercial orcharding. Orchard surveys, production costs, root-stock adaptations, pruning tests, and studies of fruits in common storage are specific examples. The course is elastic and may extend over the full year. Some extra expense incident to visiting other sections of the state or for the purchase of materials may be required of the student.

210. MARKET GARDENING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Mr. Balch.

This course is made as practical as possible. In the classroom the lecture work is reinforced with problems concerning the business end of market gardening. The students are required to prepare seed orders and

estimate the cost per acre of growing various garden crops. Particular stress is laid upon the harvesting, storing, and marketing of vegetables.

Laboratory.—The laboratory work is given in the College gardens. Each student is assigned a plot of ground to plant and care for during the semester. Careful records are kept of cultural operations and the yields. Disease and insect control are studied in a practical way.

222. HISTORY AND LITERATURE OF LANDSCAPE GARDENING. Elective, first semester. Class work, two hours. Two semester credits. Mr. Wiedorn.

This course consists of a study of the history and literature of landscape gardening with special reference to the early influences as they govern modern design.

223. CIVIC ART. Elective, first and second semesters. Class work, three hours. Three semester credits. Prerequisite: Hort. 222. Mr. Wiedorn.

This is a general course. The subjects considered are city layout, civic centers, parks and park systems, playgrounds, streets and boulevards, city nuisances, civic improvement societies, etc. Some of the lectures are illustrated by slides and special emphasis is placed upon the problems of the smaller cities.

225. PLANT MATERIALS IN LANDSCAPE GARDENING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Hort. 101. Mr. Wiedorn.

A thorough study is made of the hardiness, form, color, habits, and adaptations of trees, both deciduous and evergreen, shrubs, hardy perennials, biennials, and annuals with a view to giving the student a working knowledge of the materials essential to formulate a working landscape plan.

233. TREE SURGERY. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Bot. 208. Mr. Wiedorn.

This course consists of a study and practice of the most approved methods of caring for ornamental trees and the technical details of planting, pruning and spraying, bolting, chaining, and cavity work. Shade tree legislation and the duties of shade-tree commissions and tree wardens are discussed.

235. HORTICULTURE SEMINAR. Elective, first semester. Class work, one hour. One semester credit. Prerequisites: Hort. 104 and 107. Professor Dickens and Professor Barnett.

The work in this course includes a study and critical discussion of recent horticultural publications and of experimental and research projects now under study in this and other agricultural experiment stations.

FOR GRADUATES

301. LANDSCAPE GARDENING II. Elective, second semester. Laboratory, nine hours. Three semester credits. Mr. Wiedorn.

A series of advanced problems, continuing course 125, from topographic surveys is offered by large areas, as parks, playgrounds, and country estates. Section profiles and perspectives will be made. Materials of construction will be discussed. Special emphasis is laid upon engineering work.

303. THE THEORY AND ÆSTHETICS OF LANDSCAPE GARDENING. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Hort. 222. Mr. Wiedorn.

A careful study is made of the underlying principles of landscape art and design. This course is primarily intended for students who wish to

specialize in landscape work, but will be of interest to all those who intend to teach.

307. **LANDSCAPE GARDENING III (or PLANTING DESIGN).** Elective, second semester and summer school. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Hort. 125 and 225. Mr. Wiedorn.

This course consists of a study of the hardiness, use, adaptation, arrangement, and æsthetic composition of trees, shrubs, vines, and flowers with reference to problems of landscape design; also the preparation of nursery lists and estimates of cost.

312. **MARKET GARDENING PROBLEMS.** Credit determined by instructor. Mr. Balch.

This course includes a study of the important methods of production of standard vegetables of both garden and greenhouse. Special attention is given to the problems of marketing, including organization and formation of first-hand markets in cities by express and parcel-post shipments and the possibilities of improving storage and shipping facilities in order to prolong the period of salable condition.

315. **POMOLOGICAL RESEARCH.** Credit determined by instructor. Professor Barnett.

Graduate students will be permitted to select any special problem that will have a direct bearing on promotion of the fruit industry. Fruit-bud formation, soil adaptation of varieties, and the effect of fertilizers are a few of the problems that offer splendid opportunities for graduate study. Data collected in this course may form the basis for a master's thesis.

318. **FORCING FLOWERS AND VEGETABLES.** Credit determined by instructor. Mr. Balch.

The propagation and cultural method, soil studies, ventilation, heating, watering, and control of greenhouse pests are among the problems studied.

Milling Industry

Professor FITZ
Associate Professor DUNTON
Miller OAKES

The Department of Milling Industry was established primarily to undertake investigations in the handling, marketing and milling of wheat. Every student of agriculture should have some knowledge of this subject, and also of the handling of grain products other than those obtained from wheat. A full and complete knowledge of the needs of grain growing as an industry must necessarily include the utilization of grain in the manufacture of food, together with the natural by-products resulting therefrom.

The department has a well-equipped plant, consisting of six double-stand 7" x 14" rolls, with necessary cleaning machinery and dust collectors, sifters, and purifiers. The results secured here are comparable with those from a regular commercial mill. A baking laboratory equipped with proofing closet, dough mixer, and electric ovens is open for student use, as is also a laboratory for chemical tests on wheat and flour.

COURSES IN MILLING INDUSTRY**FOR UNDERGRADUATES**

101. **PRINCIPLES OF MILLING.** Sophomore year and elective, second semester. Laboratory, three hours. One semester credit. Miller Oakes.

This course includes a study of the theory and practice of milling with demonstrations on a small experimental mill.

102. **GRAIN MARKETING.** Junior year and elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Agron. 101. Professor Fitz.

This course includes a study of methods of handling, storing, marketing and grading of grain; the history of the origin and development of grain inspection and grades; a study of commercial grain grades and government standards; the classification and organization of inspection systems; the organization and functions of grain exchanges or boards of trade; and principal grain markets, with receipts, shipments, and consumption.

103. **GRAIN PRODUCTS.** Junior year and elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Mill. Ind. 102. Professor Fitz.

A brief study of the methods of manufacturing food products from cereals, with the resulting by-products, and a comparison of composition and feeding value of these by-products are included in this course.

109. **MILLING PRACTICE I.** Junior year and elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Mill. Ind. 101. Miller Oakes.

This course consists of practice in the art of milling, with demonstrations on a model mill.

110. **MILLING PRACTICE II.** Senior year and elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Mill. Ind. 109. Miller Oakes.

This course is a continuation of Milling Practice I.

FOR GRADUATES AND UNDERGRADUATES

203. **WHEAT AND FLOUR TESTING.** Senior year and elective, first semester. Class work, one hour; laboratory, nine hours. Four semester credits. Prerequisites: Mill. Ind. 103, Chem. 120, and 260. Associate Professor Dunton.

This course includes special quantitative tests applied to cereals and their by-products; methods of analysis and interpretation of results.

204. **EXPERIMENTAL BAKING A.** Senior year and elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Mill. Ind. 203. Associate Professor Dunton.

This course includes practice in baking tests; comparison of methods, formulas, and flour; and interpretation of results.

205. **EXPERIMENTAL BAKING H.** Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Food and Nut. 106. Associate Professor Dunton.

This course includes demonstration in milling and practice in bread making; comparison of methods, yeasts and flours, and a study of the more important conditions which influence the quality of bread.

Poultry Husbandry

Professor LIPPINCOTT
Associate Professor PAYNE
Superintendent MUGGLESTONE

The poultry plant, occupying twelve acres and situated just north of the northeast corner of the College campus, is devoted to the breeding and rearing of the stock used for class work. It is equipped with various types of houses, runs, incubators, and brooders, and with flocks of the leading breeds of fowls.

There is in the government and state experiment stations and in schools and colleges an increasing demand for men with experience and systematic training in handling poultry. There is likewise a growing demand for men to enter poultry-packing houses and for men capable of managing poultry-farming enterprises of considerable proportions.

COURSES IN POULTRY HUSBANDRY

FOR UNDERGRADUATES

101. FARM POULTRY PRODUCTION. Sophomore year, both semesters and summer school. Class work, one hour; laboratory, three hours. Two semester credits. Professor Lippincott and Associate Professor Payne.

This course takes up the problems of poultry management on the general farm. The subjects of feeding, housing, breeding, culling, incubation, brooding, and preparing poultry for market are studied.

102. HOME POULTRYING. Elective, second semester. Open to women only. Class work, three hours for the first half of the semester. One and one-half semester credits. Professor Lippincott and Associate Professor Payne.

This course takes up the problems of poultry management for egg and meat production. The subjects of feeding, breeding, culling, housing, incubation, brooding, and preparing poultry for market are studied. It is given with the elective course, Dairy Husb. 112, the second half of the semester.

104. PRACTICE IN POULTRY FEEDING. Elective, second semester. Three times a day, seven days a week, for a period of six weeks, at hours outside of the regular schedule. One semester credit. Prerequisite: Poult. Husb. 101. Associate Professor Payne.

This course consists of the actual care of a flock of fowls by the student under the supervision of an instructor. Careful records are kept of the feeds consumed and the eggs produced. A financial statement is required at the end of the feeding period.

105. PRACTICE IN INCUBATION. Elective, second semester. Three times a day, seven days a week, for a period of not less than four weeks at hours outside of regular schedule. One to two semester credits. Prerequisite: Poult. Husb. 101. Associate Professor Payne.

This course consists of the care of an incubator by the student through the incubation period, testing the eggs and bringing off the hatch. Careful records of fertility, cost of incubation, and varying temperature, moisture, and ventilation conditions are kept. For one credit one successful hatch must be brought off in either a hot-air or hot-water incubator; for further credit other types must be operated. Students specializing in poultry husbandry must take two credits.

107. PRACTICE IN BROODING. Elective, second semester. Three times a day, seven days a week, for a period of not less than four weeks, at hours outside the regular schedule. One to three semester credits. Prerequisite: Poult. Husb. 101. Associate Professor Payne.

In this course each student handles a flock of chicks. He has the entire care of brooding and feeding them during the most critical weeks. A

report of cost of fuel and feed, of gains in weight and of mortality is required. This course must be preceded or accompanied by practice in incubation. For one credit, a group of at least fifty chicks must be successfully brooded for four weeks, in any one of the several types of brooders. For further credits, broods must be handled successfully in two other types of brooders for at least six weeks. Students specializing in poultry husbandry must take three credits.

108. PRACTICE IN MILK FEEDING. Elective, first semester. Twice a day, seven days a week, for a period of six weeks, at hours outside the regular schedule. One semester credit. Prerequisite: Poult. Husb. 101. Associate Professor Payne.

This course consists of milk feeding poultry confined in crates. The time is divided into periods of two weeks, so that the student will have an opportunity to fatten three lots of chickens. A financial statement is required.

110. POULTRY BREEDS AND TYPES. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Associate Professor Payne.

In this course a historical study is made of the various breeds commonly found on the Kansas farm. Particular attention is paid to tracing the evolution of the present types. The laboratory is given over largely to judging the different breeds and varieties, both by score card and by comparison.

111. ADVANCED POULTRY JUDGING. Elective, second semester. Laboratory, three hours. One semester credit. Prerequisite: Poult. Husb. 110. Associate Professor Payne.

This course is a continuation of Poult. Husb. 110. It gives further practice in judging the more common varieties, and takes up some of the rarer breeds.

112. MARKET POULTRY. Elective, first semester. Class work, one hour; laboratory, three to six hours. Two to three semester credits. Prerequisite: Poult. Husb. 101. Associate Professor Payne.

In this course the lectures cover the methods of handling market poultry, alive and dressed. For three hours of laboratory work, practice is given in candling and grading eggs, caponizing, killing, cooling, grading and packing poultry for market. When six hours of laboratory work is taken, the student will also feed three lots of chickens for a period of two weeks.

FOR GRADUATES AND UNDERGRADUATES

202. POULTRY BREEDING. Elective, second semester. Conferences and laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 221. Associate Professor Payne.

The experimental work on inheritance in poultry is reviewed by means of assigned readings and laboratory experiments.

POULTRY FARM MANAGEMENT. See Ag. Ec. 206.

POULTRY BACTERIOLOGY. See Bact. 216.

POULTRY ANATOMY. See Anat. 210.

204. COMPARATIVE ANATOMY OF DOMESTIC BIRDS. Elective, second semester. Offered alternate years; given in 1922-'23. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Zoöl. 117. Professor Lippincott.

This course is designed particularly for those intending to teach, or carry on research in, poultry husbandry, or who are particularly interested in bird study. The various structures of domestic birds are discussed in the lectures, in their relation to the same structure in wild forms, and in a limited measure to other vertebrates, as well as from a development standpoint.

The laboratory work is given over to the dissection and the first-hand comparison of the structures of the several species of domestic birds common in the Central West.

206. **POULTRY PROBLEMS.** Elective, both semesters and summer school. Credit as arranged. Prerequisites: Poult. Husb. 101, 104, 105, and 107, and such other courses as the problem undertaken may require. Professor Lippincott and Associate Professor Payne.

In this course the student pursues a definite investigation concerning some phase of poultry work. Arrangements must be made to continue this work through more than one semester when the problem attacked cannot be solved within the limits of a single semester.

FOR GRADUATES

30. **POULTRY RESEARCH.** Elective, both semesters and summer school. Credit as arranged. Prerequisites: Poult. Husb. 101, 104, 105, 107, and such other courses as the problem undertaken may require. Professor Lippincott.

In this course a definite line of investigation is followed which may form the basis of a thesis presented in partial fulfillment of the requirements for the degree of Master of Science.

Agriculture in the Summer School

During recent years the greatest hindrance to the general introduction of agriculture into the high schools and grade schools of the state has been the lack of properly prepared teachers. The recent Federal Smith-Hughes act and its acceptance by the state of Kansas will within a few years lead to a large demand for teachers of vocational agriculture in Kansas high schools. The World War has both increased the demand for teachers of agriculture and demonstrated the necessity of the introduction of vocational agriculture into the high schools. The Agricultural College stands ready to aid teachers of the state, young women as well as young men, in their preparation to meet these demands, and the Summer School offers to active teachers an exceptional opportunity in this respect.

The work offered in the summer session includes courses in elementary agriculture, grain crop production, forage crop production, teachers' course in soils and crops, soil fertility, teachers' course in animal husbandry, elements of dairying, dairy judging, plant propagation, market gardening, orcharding, landscape gardening, farm poultry production, teachers' course in poultry husbandry, and special methods in the teaching of agriculture. Special emphasis is laid upon the subject matter and methods adapted to secondary and elementary schools.

Brief information regarding many of these courses in the Summer School may be found in the department descriptions in this catalogue. For further information write to the dean of the Summer School.

Special Courses in Agriculture

The Farmers' Short Course, the Commercial Creamery Short Course, the Course in Testing Dairy Products, and the Milling Industry Short Course are grouped with other special courses in another part of the catalogue, and are there described. They may be found by reference to the general index in the back of this book.

Division of Veterinary Medicine

RALPH RALPH DYKSTRA, *Dean*

The College has one of the best-equipped schools of veterinary medicine in the West. It is rated in class "A" by the United States Department of Agriculture, which rating places it among the best in the United States and Canada. In addition to giving the student the best possible technical training in veterinary medicine, the course is designed to give the broad culture necessary for men who are to take their places in public affairs. Professional men, such as veterinarians, are placed in a more or less public relation to the communities they serve. They must have a broad groundwork in cultural and ethical training, which will win them the confidence and respect of their communities. Success is measured in something more than dollars and cents, and the man whose view of life is no broader than his profession adds but little to the world and its happiness. The training given by the College in veterinary science seeks to emphasize the value of the man as a man, as much as his value as a specialist.

The Division of Veterinary Medicine gives most of the technical work in the curriculum in veterinary medicine, a general description of which is given below. The division is housed in the Veterinary Building, which was erected at a cost of over \$60,000, and is thoroughly equipped throughout. It contains modern classrooms, and its laboratories possess the necessary appliances for illustrating the several subjects required. The mode of instruction is more specifically detailed in succeeding sections.

The policy adhered to in the instruction in all the departments is that the science of veterinary medicine is the foundation, and the art merely supplementary. A thorough drill is given in the foundation studies, and later in the curriculum practical application of these is made in actual field work. This result is a thoroughly scientific veterinary education.

In the arrangement of the schedule of the veterinary curriculum it is implied that the courses should be followed in regular sequence, as each year's work depends upon the work done the previous year. Certain courses, however, may be selected as electives if a student has the necessary prerequisites. These courses are mentioned in the list of electives.

THE CURRICULUM IN VETERINARY MEDICINE

Veterinary medicine has made remarkable advances within recent years, and is taking its place alongside human medicine as a science. In truth, medical science and veterinary science are but specialized branches of the same science, and must be developed together. The modern veterinarian takes his place in the community as a professional man of education and culture. With the general improvement of the live stock on the farms, and with the advance of live stock in value, there is constant increase in the demand for skilled physicians to care for them.

The veterinarian, while primarily trained to conserve the health of farm animals, has a yet larger service to render in preventing diseases common to both man and beast from being communicated from domestic animals to man. Moreover, he must see that the animals slaughtered for meat are healthy and that the products are handled under such conditions as to render them suitable for human food. The public is now demanding that milk and other food products be free from contamination and that they be incapable of transmitting dangerous diseases, like tuberculosis, typhoid fever, scarlet fever, and diphtheria. There is ample work for all of the thoroughly competent veterinarians that the colleges of the country will train.

The curriculum in veterinary medicine at the Agricultural College was established to give the young men of this state an opportunity to pursue these studies in an agricultural environment, where the facilities offered by other branches of the College would be at their command. While the instruction in this curriculum is largely technical, enough subjects of a general character are included to give a sound education and a broad outlook. Better to fit the veterinarian to deal wisely with the live-stock problems which he has to meet, he is required to take the work in live-stock feeding, breeding and judging, and in milk inspection, zoölogy, and embryology, in addition to his purely professional work.

The diploma from this school is recognized by the United States Department of Agriculture, by the United States Civil Service Commission, by the American Veterinary Medical Association, and by the various examining boards of the several states and territories of America where it has been presented.

THE CURRICULUM IN ANIMAL HUSBANDRY AND VETERINARY MEDICINE

The combined curriculum in animal husbandry and veterinary medicine has been outlined so that students may receive the degree of Bachelor of Science at the end of four years, and the degree of Doctor of Veterinary Medicine at the end of two years more, thus securing both degrees in six years.

Curriculum in Veterinary Medicine

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER

| | |
|------------------------|-----------|
| Anatomy I | |
| Anat. 101 | 6(3-9) |
| Histology I | |
| Path. 101 | 3(1-6) |
| Chemistry AV-I | |
| Chem. 105 | 5(3-4, 2) |
| General Zoölogy, Vet. | |
| Zoöl. 111 | 3(2-3) |
| Military Science B-I | |
| Mil. Tr. 121 | 1(0-4) |
| Physical Education M-I | |
| Phys. Ed. 103 | R(0-2) |

SECOND SEMESTER

| | |
|-------------------------|---------|
| Anatomy II | |
| Anat. 106 | 7(3-12) |
| Histology II | |
| Path. 106 | 3(1-6) |
| Chemistry V-II | |
| Chem. 106 | 5(3-6) |
| Embryology, Vet. | |
| Zoöl. 114 | 2(1-3) |
| Military Science B-II | |
| Mil. Tr. 122 | 1(0-4) |
| Physical Education M-II | |
| Phys. Ed. 104 | R(0-2) |

SOPHOMORE

FIRST SEMESTER

| | |
|--|---------|
| Anatomy III | |
| Anat. 111 | 5(1-12) |
| Comparative Physiology I | |
| Anat. 121 | 5(4-3) |
| Medical Botany | |
| Bot. 126 | 2(1-3) |
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Types and Classes of Live Stock (Vet.) | |
| An. Husb. 134..... | 3(1-6) |
| Military Science B-III | |
| Mil. Tr. 123 | 1(0-4) |
| Physical Education M-III | |
| Phys. Ed. 105 | R(0-2) |

SECOND SEMESTER

| | |
|---------------------------|--------|
| Anatomy IV | |
| Anat. 116 | 3(1-6) |
| Comparative Physiology II | |
| Anat. 126 | 3(2-3) |
| Pathogenic Bacteriology I | |
| Bact. 111 | 4(2-6) |
| Materia Medica I | |
| Surg. 151 | 2(2-0) |
| Principles of Feeding | |
| An. Husb. 152 | 3(3-0) |
| Genetics | |
| An. Husb. 221 | 3(3-0) |
| Military Science B-IV | |
| Mil. Tr. 124 | 1(0-4) |
| Physical Education M-IV | |
| Phys. Ed. 106..... | R(0-2) |

JUNIOR

FIRST SEMESTER

| | |
|----------------------------|--------|
| Surgery I | |
| Surg. 101 | 3(3-0) |
| Diagnosis | |
| Surg. 170 | 2(2-0) |
| Materia Medica II | |
| Surg. 156 | 2(2-0) |
| Pharmacy | |
| Surg. 166 | 1(0-3) |
| Pathology I | |
| Path. 201 | 5(4-3) |
| Pathogenic Bacteriology II | |
| Bact. 116 | 4(2-6) |
| Clinics I | |
| Surg. 136 | 3(0-9) |

SECOND SEMESTER

| | |
|-----------------|--------|
| Surgery II | |
| Surg. 106 | 3(3-0) |
| Medicine I | |
| Surg. 173 | 4(4-0) |
| Horseshoeing | |
| Surg. 126 | 1(1-0) |
| Therapeutics | |
| Surg. 161 | 3(3-0) |
| Pathology II | |
| Path. 206 | 6(4-6) |
| Clinics II | |
| Surg. 139 | 3(0-9) |

SENIOR

FIRST SEMESTER

| | |
|-------------------|---------|
| Surgery III | |
| Surg. 111 | 3(3-0) |
| Medicine II | |
| Surg. 176 | 5(5-0) |
| Pathology III | |
| Path. 211 | 3(2-3) |
| Meat Inspection | |
| Path. 216 | 2(2-0) |
| Parasitology | |
| Zoology 123 | 2(1-3) |
| Clinics III | |
| Surg. 142 | 4(0-12) |

SECOND SEMESTER

| | |
|----------------------|---------|
| Surgery IV | |
| Surg. 116 | 3(3-0) |
| Medicine III | |
| Surg. 180 | 5(5-0) |
| Ophthalmology | |
| Surg. 183 | 1(1-0) |
| Operative Surgery | |
| Surg. 121 | 1(0-3) |
| Jurisprudence | |
| Anat. 161 | 1(1-0) |
| Obstetrics | |
| Surg. 131 | 3(3-0) |
| Dairy Inspection II | |
| Dairy Husb. 118..... | 1(0-3) |
| Clinics IV | |
| Surg. 145 | 4(0-12) |

Curriculum in Animal Husbandry and Veterinary Medicine*

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

Freshman year of the curriculum in agriculture

SOPHOMORE

FIRST SEMESTER

| | |
|--------------------------|-----------|
| Organic Chemistry | |
| Chem. 120 | 3(2-2, 1) |
| General Zoölogy | |
| Zoöl. 105 | 5(3-6) |
| Anatomy I | |
| Anat. 101 | 6(3-9) |
| Grain Crop Production | |
| Agron. 101 | 3(2-2, 1) |
| Military Science III | |
| Mil. Tr. 103..... | 1(0-4) |
| Physical Education M-III | |
| Phys. Ed. 105..... | R(0-2) |

SECOND SEMESTER

| | |
|---------------------------|-----------|
| Quantitative Analysis I | |
| Chem. 150 | 2(0-6) |
| Pathogenic Bacteriology I | |
| Bact. 111 | 4(2-6) |
| Anatomy II | |
| Anat. 106 | 7(3-12) |
| Forage Crop Production | |
| Agron. 102 | 3(2-2, 1) |
| Agricultural Journalism | |
| Ind. Jour. 121..... | 1(1-0) |
| Military Science IV | |
| Mil. Tr. 104..... | 1(0-4) |
| Physical Education M-IV | |
| Phys. Ed. 106..... | R(0-2) |

JUNIOR

FIRST SEMESTER

| | |
|--------------------|---------|
| Embryology | |
| Zoöl. 117 | 3(2-3) |
| Anatomy III | |
| Anat. 111 | 5(1-12) |
| Histology I | |
| Path. 101 | 3(1-6) |
| General Entomology | |
| Ent. 101 | 3(2-3) |
| Electives† | 3 |

SECOND SEMESTER

| | |
|-----------------------|--------|
| Principles of Feeding | |
| An. Husb. 152 | 3(3-0) |
| Anatomy IV | |
| Anat. 116 | 3(1-6) |
| Histology II | |
| Path. 106 | 3(1-6) |
| Electives† | 7 |

SENIOR

FIRST SEMESTER

| | |
|--------------------------|--------|
| Genetics | |
| An. Husb. 221..... | 3(3-0) |
| Comparative Physiology I | |
| Anat. 121 | 5(4-3) |
| Soils | |
| Agron. 131 | 4(3-3) |
| Agricultural English | |
| Engl. 137 | 3(3-0) |
| Electives | 1 |

SECOND SEMESTER

| | |
|----------------------------|-----------|
| Agricultural Relationships | |
| Gen. Agric. 201..... | 1(1-0) |
| Soil Fertility | |
| Agron. 132 | 3(2-2, 1) |
| Comparative Physiology II | |
| Anat. 126 | 3(2-3) |
| Materia Medica I | |
| Surg. 151 | 2(2-0) |
| Electives | 7 |

FIFTH YEAR

Junior year of the curriculum in veterinary medicine

SIXTH YEAR

Senior year of the curriculum in veterinary medicine

* This curriculum is so arranged that students may receive the degree of Bachelor of Science (in agriculture) at the end of four years, and the degree of Doctor of Veterinary Medicine at the end of two more years.

† Six semester credit hours of junior electives must be chosen from the work offered by the departments of history, economics, education, modern languages, or mathematics.

Anatomy and Physiology

Professor BURT

Assistant Professor McLEOD

This branch of veterinary medicine extends over the freshman and sophomore years for veterinary students, and one semester is required in the curriculum in agriculture.

The classroom instruction consists of lectures, quizzes and recitations and special dissection of the part under discussion, also a study of dissected specimens, various models, and the Azoux model of the horse. Mounted skeletons and limbs, and loose bones are abundant in the museum. The horse is taken as a type and the other domestic animals are compared with the horse. As often as necessary parts of other animals are dissected to show the differences.

The subjects for dissection are preserved by the injection of a formalin solution followed by a starch solution colored red, which fills and hardens within the arteries. Each half of the subject is divided into three parts; namely, the head and neck, fore limb and thorax, hind limb and posterior half of body. The students work in pairs, each pair dissecting one part before passing on to another part. The work is so arranged that bones are first studied, then the muscles and joints. This is followed by the dissection of the circulatory and nervous systems. The viscera of certain regions are studied by the students at work on those respective parts, i. e., the abdominal organs are studied by the students at work on the hind limb, etc.

The courses in anatomy require several lecture rooms, which contain models, skeletons, and bones of all kinds, and a thoroughly sanitary dissecting room equipped with all of the latest materials necessary to give a course in anatomy second to none on the continent.

The equipment for instruction in physiology is ample to give the student a thoroughly comprehensive course of laboratory study.

In addition to numerous atlases and charts furnished by the College, the student is required to have Sisson's *Veterinary Anatomy* as a textbook and Sisson's *Dissecting Guide* as a laboratory guide.

COURSES IN ANATOMY

FOR UNDERGRADUATES

101. ANATOMY I. Freshman year, first semester. Class work, three hours; laboratory and dissection, nine hours. Six semester credits. Doctors Burt and McLeod.

This course consists of the osteology, or the study of the bones, and the dissection of one-third of the horse. The bones of the horse are studied in detail and a comparison of the bones of other domestic animals, including man and chicken, is made. Drawings of the bones are made by the student in order that he may obtain a better mental picture of their shape and characteristic parts. The bones of the head are studied separately and collectively. Careful attention is given to the sinuses of the head and points of ossification. For convenience the horse is divided into three regions or parts for dissection; therefore, the one-third dissected during this semester may be any third of the subject, depending upon the part upon which the student is working.

106. ANATOMY II. Freshman year, second semester. Class work, three hours; dissection, twelve hours. Seven semester credits. Prerequisite: Anat. 101. Doctors Burt and McLeod.

This course is a continuation of the work begun in Anatomy 101. The course deals with myology and arthrology. The student is required to make a careful dissection of the muscles of the body, learning their location, attachments and relations one to another, as well as their relations to other important structures. After the muscles are dissected and learned the student dissects the ligaments of the various joints. The student also studies the viscera of the respective parts at the time of dissection of that part. Check cards and drawings indicating the different stages of dissection are kept, and the work is checked at frequent intervals.

111. ANATOMY III. Sophomore year, first semester. Class work, one hour; dissection, twelve hours. Five semester credits. Prerequisite: Anat. 106. Doctor Burt.

This course and Anatomy IV consist of the study of angiology and neurology and all parts not previously dissected. Having had osteology and myology, the student is now prepared to get an accurate mental picture of the distribution, location and relation of the blood vessels and nerves. As in Anatomy II, the subject is divided into three parts. During this semester two parts will be dissected, leaving one part for Anatomy IV. Drawings are required as in Anatomy II.

116. ANATOMY IV. Sophomore year, second semester. Class work, one hour; dissecting, six hours. Three semester credits. Prerequisite: Anat. 111.

This course is a continuation of Anatomy III. The student will now complete the dissection of every part of the subject, including special parts, as the foot, brain, eye, etc. In addition to the completion of the dissection of the horse, a comparative study of the principal structural differences of the various domestic animals, not studied concurrently with the previous courses, will now be made.

FOR GRADUATES AND UNDERGRADUATES

201. SPECIAL ANATOMY. Elective, first or second semester. Class work, one hour; dissection, nine hours. Four semester credits. Prerequisite: Any of the courses in Anatomy 101, 106, 111, 116, and 131, or their equivalent. Doctor Burt.

This course is adaptable to the requirements of the line of work in which the student is specializing. The work consists of the study of any part of the horse, as the digestive system, the genital system, etc., or may take up the study of similar parts of the ox, sheep, pig, etc. For any one so desiring, poultry anatomy may be chosen.

COURSES IN PHYSIOLOGY

FOR UNDERGRADUATES

121. COMPARATIVE PHYSIOLOGY I. Sophomore year, first semester. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Anat. 101 and 106, and Chem. 106. Doctors Burt and McLeod.

This course treats of the physiology of domestic animals, beginning with the study of the blood, heart, blood vessels, and continuing with the ductless glands and internal secretions, respirations, digestion, and absorption. Textbook: *A Manual of Veterinary Physiology*, by Fred Smith.

Laboratory.—The laboratory work consists of a practical application of the knowledge derived in the classroom. The laboratory is equipped with all necessary material and apparatus, such as hymographs, manometers, tambours, inductoriums, signal magnets, and electric clocks, to make the work interesting and practical, as well as instructive. Many experiments are made by the students upon themselves, as well as upon

the domestic animals. Graphic records are made by the students of the blood pressure, rate and amplitude of the pulse, and respiration; also the changes produced by stimulating certain nerves, exercise changes in position, the action of certain drugs, etc. The time of coagulation of the blood of various species of animals and the conditions that influence the rapidity of coagulation are considered. The secretion of the various digestive juices, the conditions that will influence the rate of their secretion and their actions are studied in detail. Laboratory directions are furnished the student. References: *Practical Physiology*, Pembry; Halliburton's *Essentials of Chemical Physiology*; *Manual of Physiology*, Stewart; *Urine of the Horse and Man*, Fish; and other standard textbooks on physiology.

126. COMPARATIVE PHYSIOLOGY II. Sophomore year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Doctors Burt and McLeod.

The work of this semester is a continuation of Anat. 121, and treats of the urine and urinary system, nutrition, animal heat, muscular and nervous systems, locomotion, generation and development, growth and decay. Textbook: Smith's *Manual of Veterinary Physiology*.

Laboratory.—The work done exemplifies the lectures given in the classroom. Graphic records are made of the normal muscle contraction, the changes brought about by fatigue, tetanus, variations in temperature, application of drugs, etc. The conductivity of the nerves, nerve blocking, the effects of anæsthetics upon the conductivity of the nerves, reflexes, and other phenomena relating to the nervous system are studied. The composition of the normal urine and the tests applicable for the detection of abnormal constituents in pathologic urine are carefully considered. Directions and references are the same as in the laboratory course in Comparative Physiology I.

FOR GRADUATES AND UNDERGRADUATES

215. PROBLEMS IN PHYSIOLOGY. Elective, both semesters. Three to five semester credits. Prerequisites: Anat. 121, 126, and 131, or their equivalent. Doctor Burt.

Individual investigational problems in the physiology of digestion, reproduction, endocrin glands, etc., are assigned.

COURSE IN ANATOMY AND PHYSIOLOGY

FOR UNDERGRADUATES

131. ANATOMY AND PHYSIOLOGY. Sophomore year, first semester. Lectures and recitations, two hours; laboratory, three hours. Three semester credits. Doctor Burt.

This combined course is intended principally for students in agriculture, and treats chiefly of physiology of the domestic animals; however, sufficient anatomy is taught to enable the student to thoroughly comprehend the correlation between the two subjects, and the physiologic relations existing among the various organs of the body.

Special emphasis is placed on the physiology of digestion, absorption, metabolism, and excretion, so that the student may have a good foundation to understand the principles of feeding, etc., but due consideration is paid to the functions of the circulatory, respiratory, and nervous systems, etc. Text: Smith's *Manual of Veterinary Physiology*.

COURSE IN JURISPRUDENCE

FOR UNDERGRADUATES

161. JURISPRUDENCE. Senior year, second semester. Class work, one hour. One semester credit. Doctor Burt.

This course deals with the veterinarian's legal responsibilities, with national and state live-stock laws, quarantine regulations, etc.

Pathology

Professor LIENHARDT
Assistant Professor SCOTT

Assistant Professor KITSELMAN
Instructor ERIKSEN

The Department of Pathology presents courses in histology, pathology and meat inspection. The instruction is presented by lectures or recitations, laboratory periods, and demonstrations which are carried out by the use of the projectoscope, and by autopsies held on dead animals.

The laboratory is fully equipped and entirely up to date. The equipment consists of microtomes, paraffin ovens, microphotographic and projection apparatus, centrifuge, shaking machine, sterilizers, etc. Each student is furnished a drawer, microscope, prepared slides for study, and all other essentials needed for study in the laboratory courses.

The department is also in possession of quite a complete pathological museum, which contains specimens of organs and tissues that show lesions typical of the various infectious, and some non-infectious diseases. These specimens are used in the study of pathology, and together with the specimens sent in from over the state and fresh material from the immediate vicinity they furnish ample material for the courses in pathology.

The department library contains text and reference books on pathology and allied subjects, also the current files of the important technical periodicals relating to pathology. These books are at the constant disposal of the student for reference.

The course in meat inspection together with the allied subjects required for a degree in veterinary medicine make the student eligible to take the civil-service examination for meat inspection. In this course advantage is taken of the local packing plant for instruction. Visits are also made to plants in Topeka and Kansas City.

COURSES IN HISTOLOGY

FOR UNDERGRADUATES

101. HISTOLOGY I. Freshman year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Doctors Lienhardt and Eriksen.

The first part of the semester is spent upon the care and manipulation of the microscope, in the use of which the student must become proficient. This is followed by a microscopical examination of cotton, woolen, silk and linen fibers, bubbles of air, and drops of oil, to enable the student to recognize these when they are accidentally mounted with tissue. The fundamental tissues are next studied: epithelial tissues with regard to form, structure, arrangement and location; connective tissues with regard to structure and location, including bone development and teeth and their development; muscular tissue, voluntary, involuntary, and cardiac; nerve tissue, the structures and forms of its cells, of medullated and nonmedullated nerve fibers; spinal cord; the blood vessels, heart, and lymphatic vessels. Blood corpuscles are studied with regard to size, shape, and structure, including each kind of white corpuscles. Also, the blood-forming organs, as bone-marrow, lymph glands, and spleen, are studied. The histology of the digestive tract is studied, including study of the mouth, the tongue, the taste buds, the parotid, the submaxillary and sublingual, the thyroid and thymus glands, and the œsophagus. In this semester the

student studies and mounts sixty-five slides, some of which are teased, and many of which are sectioned in paraffin and celloidin. Textbook: *Histology*, by Stohr, or *Histology*, by Bailey.

106. HISTOLOGY II. Freshman year, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Doctors Lienhardt and Eriksen.

In this semester the student takes up the study of the stomachs of the dog, the horse, and the ox; the small intestines—duodenum, jejunum, and ileum; the large intestines—cæcum, colon, rectum and anus; liver, the pancreas, the respiratory tract—nasal mucous membrane, larynx, trachea, bronchi and lungs; the urinary organs—kidney, ureter, bladder, urethra; the male and female genital organs; the skin and its appendages; the suprarenal gland; the medulla; the cerebellum; the cerebrum; the eye; and the ear. During this semester the student stains, mounts, studies with microscope and makes drawings of the above-mentioned tissues. Some of the tissues studied are injected with gelatin mass to bring out the blood vessels. Textbook: *Histology*, by Stohr, or *Histology*, by Bailey.

FOR GRADUATES AND UNDERGRADUATES

225. SPECIAL HISTOLOGY. Second semester. Class work, one hour; laboratory, six hours. Three semester credits. Doctor Lienhardt.

This course is arranged to meet the requirements of those who are desirous of taking a histology course dealing with specific organs, as those concerned with digestion, respiration, etc. Tissues are fixed, dehydrated, imbedded, sectioned, stained, and mounted, and are studied after being properly prepared.

COURSES IN PATHOLOGY

FOR GRADUATES AND UNDERGRADUATES

201. PATHOLOGY I. Junior year, first semester. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Path. 106, Anat. 126, and Bact. 111. Doctors Lienhardt and Eriksen.

The course in general pathology treats of the history of pathology, predisposition, immunity, congenital and inherited disease; circulatory disturbances—cardiac difficulties, hyperæmia, hemorrhage, dropsy, œdema, thrombosis, embolism, and alteration of the blood; disturbances in metabolism—fever, necrosis, atrophy, cloudy swelling, fatty changes, inflammation, calcification and concretum formation; and process of repair, tumors, and functional disturbances. Text: *Comparative General Pathology*, by Kitt.

206. PATHOLOGY II. Junior year, second semester. Class work, four hours; laboratory, six hours. Six semester credits. Doctors Lienhardt and Eriksen.

This course is devoted to special pathology and pathological technique; collecting, fixing, hardening, embedding in celloidin and paraffin, sections of fresh, frozen, and embedded tissues; and a study of the method of preserving gross specimens. Considerable time is devoted to stains and the method of staining. This work is followed by special pathology, which includes the macroscopic and microscopic examination of the following tissues in all of the pathological conditions to which they are subject: cardiac muscle, skeletal muscle, the liver, the kidney, the bladder, the pancreas, the lungs, the digestive tract, the serous membranes, the vascular system, the lymph nodes, the spleen, bone, skin, and genital organs. The students stain, mount, study, and make drawings of the above-mentioned tissues. Textbooks: *Pathology* by Delafield and Prudden; *Pathologische Anatomie*, by Kitt; and *Pathology*, Vol. II, by Adami and Nichols.

211. PATHOLOGY III. Senior year, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Doctors Lienhardt and Eriksen.

This course is devoted to the pathology of the infectious diseases and to laboratory diagnosis. Post-mortem examinations are made on all animals dying in the hospital at the College barns and in the neighborhood. The students attend and take turns in holding the autopsy. Each student is expected to keep a written report of the pathological changes, also of the microscopic findings. The above work is done under the direction of the pathologist in charge. Text: *Pathology of Infectious Diseases*, by Moore.

216. MEAT INSPECTION. Senior year, first semester. Class work, two hours. Two semester credits. Doctor Lienhardt.

The course in meat inspection is designed to prepare men for national, state, and local sanitary work, which is being more strongly urged and demanded every day. The kinds and classes of stock, the traffic and transportation of animals, their inspection before death, their slaughter, the normal conditions of healthy animals, the diseases discernible at the time of slaughter, the disposition of the condemned from economic, hygienic and sanitary standpoints, and different preparations and methods of preservation, adulterations, sanitary laws and regulations, and other points bearing upon the question of healthful meat production, are considered. Visits are made to the local slaughtering establishments, and to the large packing plants in Topeka, Kansas City or Wichita. Text: *Edelman's Meat Hygiene*, translated by Mohler and Eichorn.

220. PATHOLOGICAL TECHNIQUE AND DIAGNOSIS I. Elective, first and second semesters. Laboratory, six hours. Two semester credits. Prerequisite: Path. 211. Doctors Lienhardt and Eriksen.

This course consists of practice in post-mortem and laboratory diagnosis. The various methods of embedding and staining tissues are carried out upon the large collection of material which the laboratory contains, as well as the material which is constantly coming into the laboratory from various parts of the state.

221. PATHOLOGICAL TECHNIQUE AND DIAGNOSIS II. Elective, first and second semesters. Laboratory, twelve hours. Four semester credits. Doctors Lienhardt and Eriksen.

This course is a continuation of Path. 220.

FOR GRADUATES

302. RESEARCH IN PATHOLOGY. Elective, both semesters. Three to five semester credits. Prerequisites: Hist. 101 and 106; Path. 201, 206, 211 and 220; Chem. 235, or their equivalent. Doctor Lienhardt.

This course includes individual research problems in pathology of the nervous system, eye and ear; also investigational work on disease caused by a filterable virus. The course is available as a master's thesis course.

Surgery and Medicine

Professor DYKSTRA
Professor MULDOON
Assistant Professor SCOTT

Assistant Professor McLEOD
Assistant Professor FRICK

For instruction in surgery and clinic the equipment is excellent. The surgical amphitheater is an annex to the main Veterinary Building, seating over three hundred people, and equipped with every modern appliance for performing before the classes the most delicate operations upon both large and small animals. The hospital has a capacity of about thirty animals and is nearly always filled with patients, which give ample material for study of internal medicine as well. The out-clinic furnishes many cases yearly, giving the student opportunity to become familiar with the diseases and their treatment under the guidance of proficient practitioners.

For the study of materia medica and pharmacy there are a general pharmacy laboratory containing all the drugs used in the practice of veterinary medicine, and a practicing pharmacy where medicines are compounded for the everyday practice connected with the College.

COURSES IN SURGERY

FOR UNDERGRADUATES

101. SURGERY I. Junior year, first semester. Class work, three hours. Three semester credits. Doctor Dykstra.

This course includes methods of restraint; asepsis and antisepsis; anæsthesia, both local and general; inoculations, bandaging, massage, controlling hemorrhage; division of tissues and the uniting of wounds; injections of medicines into the subcutaneous tissues, blood streams, trachea, spinal canal. Animal dentistry is taken up very thoroughly, in so far as it constitutes an important part of the veterinarian's work. The students have free access to a large number of museum specimens of abnormal teeth. Also, many dental patients are presented at the College hospital for treatment.

106. SURGERY II. Junior year, second semester. Class work, three hours. Three semester credits. Doctor Dykstra.

This course considers in regular order the surgical diseases of the head, neck, thorax, abdomen, stomach and bowels, urinary organs, and organs of generation.

111. SURGERY III. Senior year, first semester. Class work, three hours. Three semester credits. Doctor Dykstra.

During this course particular attention is paid to causes, symptoms, and treatment of lameness. It considers in detail fractures and their reduction, diseases of joints, tendons and sheaths, muscles and fascia, and surgical diseases of the foot.

116. SURGERY IV. Senior year, second semester. Class work, three hours. Three semester credits. Doctor Dykstra.

Surgery as taught during this course includes special operations, such as neurectomies, autoplasties, desmotomies, actual cauterization, tenotomies, myotomies, enterotomy and enteroanastomosis, and surgery of the eye. Reference books: *Dollar's Regional Veterinary Surgery*; *Merillat's Veterinary Surgery*, Vols. I, II, and III; *Williams' Surgical Operations*; *Fleming's Operative Veterinary Surgery*, Parts I and II; *White's Restraint of Domestic Animals*.

121. OPERATIVE SURGERY. Senior year, second semester. Laboratory, three hours. One semester credit. Doctors Dykstra and Frick.

Old horses are purchased by the department, placed on the operating table, anæsthetized, and over one hundred operations are performed on the animal. During this work the student is required to observe a careful technique, such as antisepsis, and, in fact, performs the operation as thoroughly and completely as possible. It is a very practical course and fits the student for surgical work in actual practice.

126. HORSESHOEING. Junior year and elective, second semester. Class work, one hour. One semester credit. Doctor McLeod.

The course is taught by means of lectures, recitations and demonstrations, taking up the various divisions in the following order: normal conformation in both limb and foot, the anatomy of these parts, physiological movements and correct normal shoeing. This is followed by a study of the proper shoeing for the correction of wry limbs and feet; diseases of the feet, and the relation of horseshoeing thereto. The course ends with the study of the shoeing of mules and oxen. Throughout the entire course the purpose is to instill in the mind of the student normal shoeing, in order that he may be able to correct abnormalities in the foot and limb in so far as this can be accomplished by shoeing. Reference books: Lungwitz's *Textbook of Horseshoeing*; Dollar's *Handbook of Horseshoeing*.

COURSE IN OBSTETRICS

FOR UNDERGRADUATES

131. OBSTETRICS. Senior year and elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Anat. 204 and Zoöl. 114, or Anat. 131 and Zoöl. 117. Doctor McLeod.

This course discusses in detail the physiology of pregnancy, anatomy of the generative organs, care and hygiene of pregnant animals, sterility, diseases incidental to pregnancy, diseases of new-born animals, care of new-born animals, abnormal presentations during parturition, surgery of obstetrics, etc. This work is supplemented by demonstrations on an obstetrical phantom and fœtus; in addition, the College farm and surrounding agricultural territory furnish an abundance of actual material. References: Williams' *Veterinary Obstetrics*, Williams' *Surgical and Obstetrical Operations*, De Bruin's *Bovine Obstetrics*, and Fleming's *Veterinary Obstetrics*.

COURSES IN CLINICS

FOR UNDERGRADUATES

136. CLINICS I. Junior year, first semester. Laboratory, nine hours. Three semester credits. Doctors Dykstra, Muldoon, and Frick.

A free clinic which affords an abundance of material is conducted. All species of domesticated animals are presented for treatment. These patients are assigned in regular order to the senior students for diagnosis and treatment; clinic sheets are provided, on which are recorded the history, symptoms, pulse, temperature, respiration, diagnosis, prognosis, treatment, and the unsoundness, defects or blemishes of the animal. The clinician in charge discusses all the abnormal conditions present in the patient, thus assisting the student to develop his powers of observation. The junior students assist the senior students and, in addition, are required to master, by practical experience, the restraint of animals, bandaging, etc. The compounding of prescriptions, the preparation of antiseptics and other medicinal agents, is taken in charge by the junior students.

139. CLINICS II. Junior year, second semester. Laboratory, nine hours. Three semester credits. Doctors Dykstra, Muldoon, and Frick.

This work is a continuation of Clinics I.

142. CLINICS III. Senior year, first semester. Laboratory, twelve hours. Four semester credits. Doctors Dykstra, Muldoon, and Frick.

Patients left at the hospital for treatment are assigned to seniors, who are required to administer all medicines, change dressings of surgical wounds, etc. All work is performed under the direct supervision of the clinician in charge. Numerous country calls are received by the Division of Veterinary Medicine. These are taken care of by one of the clinicians, who is always accompanied by one or more senior students. This phase of the work is particularly valuable, as it gives the student practical experience under actual conditions.

145. CLINICS IV. Senior year, second semester. Laboratory, twelve hours. Four semester credits. Doctors Dykstra, Muldoon, and Frick. This work is a continuation of Clinics III.

COURSES IN MATERIA MEDICA

FOR UNDERGRADUATES

151. MATERIA MEDICA I. Sophomore year, second semester. Class work, two hours. Two semester credits. Doctor Frick.

The course includes definitions of terms, modes of action of drugs in general, their method and rapidity of absorption and elimination, physiological and chemical incompatibles, etc. The drugs and medicinal agents are grouped according to their action. The lecturer discusses the origin, physical properties, active constituents, and official preparations of the medicinal agents.

156. MATERIA MEDICA II. Junior year, first semester. Class work, two hours. Two semester credits. Doctor Frick.

This course is a continuation of Materia Medica I.

161. THERAPEUTICS. Junior year, second semester. Class work, three hours. Three semester credits. Prerequisites: Materia Medica I and II. Doctor Frick.

The student is thoroughly drilled in the physiological action of the various drugs, or action on the healthy animal, and the therapeutic action, or action on the diseased animal. A course in toxicology is included in this work, taking up the symptoms and treatment of poisons frequently encountered in veterinary practice. The science of posology, or dosage, is considered of the utmost importance, and a liberal amount of time is devoted to it, taking up the proper dose of the crude drug and its preparation for the horse, cow, dog, cat, and swine. Reference works: *Milk's Practical Veterinary Pharmacology and Therapeutics*; *Froehner's Text-book of General Therapeutics*; *Winslow's Veterinary Materia Medica and Therapeutics*; *United States Dispensatory*; *Wood's Therapeutics, its Principles and Practice*.

166. PHARMACY. Junior year, first semester. Class and laboratory work, three hours. One semester credit. Doctor Frick.

In the lectures the meanings of the various pharmaceutical terms are discussed. Various systems of weights and measures, and the conversion of one system into another, are taught. Official preparation of each is studied in regular order. Particular stress is placed upon prescription writing, the student being taught to avoid incompatibilities, to give nouns the proper case ending, and to understand the meanings of certain Latin phrases. In the laboratory work the principles of filtration, percolation, hot-water and sand baths, etc., are taught. The student is required to prepare at least one of each of the following preparations: An infusion, a decoction, a tincture, a wine, a syrup, a fluid extract, a liniment, an emulsion, a liquor, an aqua, a spirit, an avolus, an ointment, an electuary, and a cataplasm. In addition, a thorough course in the compounding of prescriptions is afforded at the clinic, where all medicines are prescribed and compounded by the students, under guidance of the

instructor in charge. Reference works: *U. S. Pharmacopœia*; Maltbie's *Practical Pharmacy*; Remington's *Practice of Pharmacy*; Fish's *Exercises in Materia Medica and Pharmacy*.

COURSES IN MEDICINE

FOR UNDERGRADUATES

170. DIAGNOSIS. Junior year, first semester. Class work, two hours. Two semester credits. Doctor Muldoon.

This is a course preparatory to the study of medicine proper. It takes up in detail the different diagnostic methods employed for the detection of diseases, including auscultation, percussion, palpation, and inspection, and also treats of the normal and abnormal abdominal and thoracic sounds, and considers in detail the specific examination of the various organs, including diagnostic inoculations as an aid to the detection of disease.

173. MEDICINE I. Junior year, second semester. Class work, four hours. Four semester credits. Doctor Muldoon.

The noninfectious diseases of the respiratory organs are studied in this course, taking up in regular order the nasal and accessory cavities the larynx, bronchi, lungs, and pleura.

176. MEDICINE II. Senior year, first semester. Class work, five hours. Five semester credits. Doctor Muldoon.

This course is devoted to noninfectious diseases of the mouth, salivary glands, œsophagus, stomach and intestines, liver, pancreas, and peritoneum. This is followed by diseases of the urinary organs, of the circulatory organs, diseases of metabolism, of the nervous system, of the organs of locomotion, and of the skin.

180. MEDICINE III. Senior year, second semester. Class work, five hours. Five semester credits. Doctor Muldoon.

The distinctly infectious and contagious diseases of domesticated animals are discussed in this course. The following order is usually adopted: Acute general infectious diseases, acute exanthematous infectious diseases, acute infectious diseases with localization in certain organs, infectious diseases with special involvement of the nervous system, chronic infectious diseases, infectious diseases produced by protozoa. In addition particular attention is given to propagation and spread of infectious diseases, predisposing and exciting causes of disease, general sanitation, etc.

183. OPHTHALMOLOGY. Senior year, second semester. Class work, one hour. One semester credit. Doctor Scott.

This course discusses the method of conducting examinations of the eye by means of the ophthalmoscope, illumination of the eye, and the use of drugs as an aid to this process; and acute and chronic diseases of the eye.

Reference books for the courses in medicine: Hutyra and Marek's *Pathology of the Diseases of Domestic Animals*, Vols. I and II; Friedberger and Frohner's *Veterinary Pathology*, Vols. I and II; Law's *Veterinary Medicine*, Vols. I, II, III, IV, and V; Moussu and Dollar's *Diseases of Cattle*; Glass' *Diseases of the Dog*; Cadot's *Clinical Veterinary Medicine*.

190. FARM ANIMALS IN HEALTH AND IN DISEASE. Elective, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Anat. 131. Doctor Frick.

First-aid treatment of diseases of domestic animals is discussed in this course. The student becomes familiar with contagious and non-contagious diseases. Special emphasis is given to the cause and prevention of disease in farm animals. Domestic animals are studied in relation to their surroundings. Text: Craig's *Common Diseases of Farm Animals*.

Division of Engineering

ROY ANDREW SEATON, *Dean*

The Division of Engineering offers curricula in agricultural engineering, architecture, civil engineering, electrical engineering, flour-mill engineering, and mechanical engineering, each leading to the degree of bachelor of science in the profession selected.

While the curricula, as scheduled, are believed to be sufficient to cover the needs of the average young man, it is possible to combine portions of the work of two or more of them in such a way that one may be prepared to take up a special line of work for which he desires to fit himself. For example, by substituting certain courses from the departments of chemistry and geology for some of those in the curriculum in mechanical engineering, a young man can fit himself for work in connection with the manufacture of cement. By substituting some of the courses in chemistry for others in mechanical engineering, a special preparation can be secured for chemical engineering. By combining some of the courses in civil and mechanical engineering and by taking additional work in chemistry and geology, a young man may fit himself for special work in connection with the development of the coal fields of the country. By combining courses in architecture and civil engineering, specialization in architectural engineering may be secured. In special cases permission will be granted to combine the work on the lines here indicated. With the permission of the dean of the division, students desiring to do so may substitute work in the reserve officers training corps for certain subjects in any of the curricula of the division.

It is believed that the curricula as tabulated give the best preparation for students expecting to follow general work in the profession selected, and for those who are not certain what particular branch of the profession they will follow. The substitutions and combinations indicated, and others similar to them, will be permitted only when there is good evidence that the student desiring such work is practically certain to follow the branch selected.

In the case of any of these modifications, the degree granted will be that of the course in which the major portion of the work is taken. In no case will the substitution of an additional amount of technical work for any of the general cultural work in the course be allowed.

Besides the four-year professional curricula, the Division of Engineering offers:

A three-year curriculum in mechanic arts in the School of Agriculture, with trade practice electives in blacksmithing, carpentry, concrete construction, and stationary and traction engines, and

Short special courses for automobile mechanics, tractor operators, carpenters, machinists, blacksmiths, electricians, and foundrymen.

These are all discussed elsewhere in this catalogue.

CURRICULUM IN AGRICULTURAL ENGINEERING

The curriculum in agricultural engineering is designed to qualify men for engineering work in rural communities; for positions in the farm-machinery and farm-motor industry; for the management of farms where drainage, irrigation or power-farming methods are prevalent; and for the positions of advisors, consulting engineers or architects in connection with farm buildings and equipment.

The work of the first year is the same as in the other engineering curricula. During the last three years about one-third of the time is devoted to agricultural subjects, in order to familiarize the students with the modern methods of scientific agriculture and to enable them to apply engineering principles to agricultural problems in a practical way. Considerable time is also devoted to farm machinery, farm motors, rural architecture, highway engineering, irrigation, drainage, and concrete construction. Advanced work is offered in rural architecture, field and power machinery, and field research on all farming tools.

The agricultural engineering students are also given considerable training in drawing, shop practice, physics, chemistry, surveying, steam engineering, gas engineering, and electrical engineering.

CURRICULUM IN ARCHITECTURE

The curriculum in architecture aims to provide the technical training which will give a broad and sound foundation for the needs of the practicing architect, as well as the essentials of a liberal education. Although closely associated with, and somewhat dependent upon, science and engineering, architecture is primarily a fine art; hence the training of the architect, while including the general fundamentals of engineering and science, must be based primarily upon a study and understanding of the basic architectural principles together with the canons of art and good taste. A major portion of the curriculum is therefore devoted to the study of architectural design, supplemented by those subjects preparatory or contributory to it.

Supporting this line of study the student is given a comprehensive view of the development of civilization together with a more detailed study of the history of architecture and of art. Throughout the course draughtsmanship as applied to architectural design and construction, as well as to free-hand drawing and sketching, is given constant attention. Courses dealing with the fundamental principles of building construction, sanitation, heating and lighting, together with a careful study of the properties and uses of building materials, are given simultaneously with the courses in design and drawing.

In addition to the above-outlined professional and technical studies, approximately one-quarter of the curriculum is devoted to more general studies designed to broaden the student's view and to give him the essentials of a liberal education. Thus it is the aim not only to provide a fundamental training upon which the student may base his professional development and advancement, but to afford a training which is in the broadest sense educational.

CURRICULUM IN CIVIL ENGINEERING

The aim of the curriculum in civil engineering, as outlined in this catalogue, is to give the young men taking the work the best possible preparation for entering upon the active practice of the profession under present conditions. It will be noted that the first and second years are devoted largely to general culture studies and the sciences, including mathematics. This follows the arrangement generally found in the engineering curricula of American colleges, and it finds its justification in the well-nigh universally accepted idea that any engineering education worthy of consideration must be grounded upon ample preliminary education in the allied sciences. An introduction to the technical work is given in these years through courses in drawing, shopwork, surveying, and the elementary phases of engineering.

The last two years are devoted largely to technical work. In recognition of the mechanical trend of the age, liberal provision is made for class and laboratory work in mechanical and electrical engineering. In view of the growing importance of municipal problems, such as paving, sewerage, and water-supply, the curriculum in civil engineering includes required courses in these subjects.

Advanced elective courses in railway, highway, and irrigation and drainage engineering are offered in the second semester of the senior year.

CURRICULUM IN ELECTRICAL ENGINEERING

The essential elements underlying a sound engineering training are based upon a thorough study of mathematics and the physical sciences. These studies, together with introductory courses in drawing, shopwork, surveying, and the elementary phases of engineering, occupy most of the time of the first two years.

Freshmen are given courses which involve the fundamental principles of electricity and magnetism and their application to electrical construction and machinery.

The professional work of this curriculum begins in the junior year and continues throughout the last two years. General culture subjects are included in the work of each of the four years.

Emphasis is placed upon training to deal with the forces and matter according to scientific principles, rather than upon the accumulation of facts. The department laboratories are well equipped with the various measuring instruments, standardizing apparatus, and different types of dynamo machinery. The different subjects are presented in the classroom, and the classroom work is supplemental by laboratory practice. The curriculum provides a liberal training in wood- and iron-working, mechanical drawing, and machine-shop practice.

The laboratory experiments selected for the students are designed to give a clear conception of the theoretical work of the classroom.

Students are given extensive practice in connecting up the different types of machines for testing purposes and for standard commercial work. This practice work and testing extends throughout the junior and senior years, and is intended to give the student familiarity with the underlying principles of the different machines, and a knowledge of the care necessary to operate them successfully. Opportunity is also given to undertake the investigation of commercial problems as they are sent to the College from the different central stations of the state.

CURRICULUM IN FLOUR-MILL ENGINEERING

The milling of wheat and other cereals is an important industry in this state. The curriculum in flour-mill engineering is designed to prepare men for the management of mills, for work in connection with the designing of milling plants, and for research work in the preparation and utilization of mill products.

The work of the freshman year is the same as in the other engineering courses. The sophomore year is similar to that of the mechanical engineering course, but includes additional chemistry and a beginning course in milling practice. In the junior and senior years, besides the courses dealing with the production, marketing, testing, and milling of grain products, a considerable amount of time is devoted to mechanics, chemistry, history, economics, business law and organization, steam and gas engineering, and flour-mill design.

CURRICULUM IN MECHANICAL ENGINEERING

The work in mechanical engineering prepares for the successful management and superintendence of factories and power plants; for the design of power machinery installations; for the design and construction of machine tools, steam and gas engines, compressors, hydraulic machinery, etc.; and for the design and erection of engineering buildings and factories, including the selection, purchasing, and location of the equipment.

The curriculum has been laid out with the aim of securing a judicious mixture of theory and practice, such as will not only give the student the technical skill required for engineering operations, but will also endow him with an understanding of the scientific and economic principles necessary for the solution of engineering and industrial problems.

Throughout the four years the theoretical studies in the classroom are supplemented by practical work in the laboratories in such a manner as very materially to strengthen both. In the materials and machinery testing laboratories the work does not end when the test is completed, but the entire problem must be written up in such a manner as would be approved in the best commercial testing laboratories. The laboratory work in the shops not only gives the student practice in performing the machining and various other mechanical operations, but includes a scientific study of the factors of production, so that the loss of material and expenditure of human effort will be a minimum.

Optional or elective courses are available in the senior year, second semester, and give the student an opportunity for instruction in the more specialized branches of mechanical engineering. These courses include: heating, ventilation, and refrigeration; factory design; aërodynamics, or aëronautical engineering; and automobile engineering.

The professional courses in mechanical engineering are given mainly in the departments of steam and gas engineering, shop practice, and applied mechanics and machine design.

Students pursuing a mechanical engineering curriculum are urged to spend at least two summers in some shop or commercial plant in order to broaden their training.

Curriculum in Agricultural Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | SECOND SEMESTER |
|---|--|
| Chemistry E-I Chem. 107 4(3-3) | Chemistry E-II Chem. 108 4(3-3) |
| Plane Trigonometry Math. 101 3(3-0) | College Algebra Math. 104 3(3-0) |
| College Rhetoric I Engl. 101 3(3-0) | College Rhetoric II Engl. 104 3(3-0) |
| Engineering Drawing Ap. Mech. 155..... 2(0-6) | Descriptive Geometry Ap. Mech. 158..... 2(0-6) |
| Surveying I Civ. Engr. 102..... 2(0-6) | Surveying II Civ. Engr. 111..... 2(0-6) |
| Extempore Speech I Pub. Spk. 106 2(2-0) | Woodwork Shop 101 1(0-3) |
| Military Science C-I Mil. Tr. 141..... 1(0-4) | Forging I Shop 150 1(0-3) |
| Engineering Lectures Gen. Engr. 101..... R | Military Science C-II Mil. Tr. 142 1(0-4) |
| Physical Education M-I Phys. Ed. 103..... R(0-2) | Engineering Lectures Gen. Engr. 101..... R |
| | Physical Education M-II Phys. Ed. 104..... R(0-2) |

SOPHOMORE

| FIRST SEMESTER | SECOND SEMESTER |
|---|--|
| Engineering Physics I Physics 145 5(4-3) | Engineering Physics II Physics 150 5(4-3) |
| Plane Analytical Geometry Math. 110 4(4-0) | Calculus I Math. 113 5(5-0) |
| American Industrial History Hist. 105 3(3-0) | Farm Crops Agron. 103 4(3-3) |
| Organic Chemistry Chem. 120 3(2-3) | Field Machinery Farm Engr. 106, 107... 2(1-3) |
| Mechanical Drawing I Ap. Mech. 161..... 2(0-6) | Forging II Shop 155 1(0-3) or |
| Military Science C-III Mil. Tr. 143..... 1(0-4) | Foundry Practice Shop 160 1(0-3) |
| Seminar Gen. Engr. 105..... R | Military Science C-IV Mil. Tr. 144 1(0-4) |
| Physical Education M-III Phys. Ed. 105..... R(0-2) | Seminar Gen. Engr. 105..... R |
| | Physical Education M-IV Phys. Ed. 106..... R(0-2) |

JUNIOR

| FIRST SEMESTER | SECOND SEMESTER |
|--|---|
| Applied Mechanics I Ap. Mech. 101, 105.... 4(3-3) | Applied Mechanics E-II Ap. Mech. 115, 120.... 4(3-3) |
| Calculus II Math. 116 3(3-0) | Economics Econ. 101 3(3-0) |
| Soils Agron. 131 4(3-3) | Power Machinery Farm Engr. 111, 112... 2(1-3) |
| Farm Motors Farm Engr. 125, 126... 3(2-3) | Kinematics Ap. Mech. 180..... 3(3-0) |
| Market Grades and Classes of Live Stock An. Husb. 131..... 3(1-6) | Principles of Feeding An. Husb. 152..... 3(3-0) |
| Seminar Gen. Engr. 105..... R | Machine Tool Work I Shop 170 2(0-6) |
| | Seminar Gen. Engr. 105..... R |

SENIOR

FIRST SEMESTER

| | |
|---------------------------|--------|
| Farm Management | |
| Ag. Ec. 106..... | 3(2-3) |
| Tractors and Trucks | |
| Farm Engr. 116, 117... | 3(2-3) |
| Rural Architecture | |
| Farm Engr. 102..... | 3(0-9) |
| Highway Engineering I | |
| Civ. Engr. 230 and Ap. | |
| Mech. 250 | 3(2-3) |
| Business Law I | |
| Hist. 163 | 1(1-0) |
| Business Organization | |
| Econ. 106 | 1(1-0) |
| Hydraulics | |
| Ap. Mech. 130, 135.... | 4(3-3) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Ap. Mech. 150, Civ. Engr. | |
| 170, Farm Engr. 175, | |
| Shop 195, or Steam and | |
| Gas 195 | 1(0-3) |

SECOND SEMESTER

| | |
|-----------------------------|-----------|
| Drainage and Irrigation I | |
| Civ. Engr. 161..... | 2(2-0) |
| Engineering English | |
| Engl. 110 | 2(2-0) |
| Electrical Engineering C | |
| Elect. Engr. 160, 165.. | 3(2-2, 1) |
| Concrete Construction | |
| Ap. Mech. 140, 145.... | 2(1-3) |
| Steam and Gas Engineering C | |
| Steam and Gas 120, 125, | 3(2-3) |
| Elements of Dairying | |
| Dairy Husb. 101..... | 3(2-3) or |
| Soil Fertility | |
| Agron. 132 | 3(2-2, 1) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Ap. Mech. 150, Civ. Engr. | |
| 170, Farm Engr. 175, | |
| Shop 195, or Steam and | |
| Gas 195 | 2(0-6) |

Curriculum in Architecture

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER

| | |
|-------------------------|--------|
| Plane Trigonometry | |
| Math. 101 | 3(3-0) |
| Perspective | |
| Arch. 128 | 1(0-3) |
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Engineering Drawing | |
| Ap. Mech. 155..... | 2(0-6) |
| Freehand Drawing I | |
| Arch. 111 | 2(0-6) |
| Architectural Drawing I | |
| Arch. 108 | 2(0-6) |
| French I | |
| Mod. Lang. 151..... | 3(3-0) |
| Military Science C-I | |
| Mil. Tr. 141..... | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101..... | R |
| Physical Education M-I | |
| Phys. Ed. 103..... | R(0-2) |

SECOND SEMESTER

| | |
|--------------------------|--------|
| College Algebra | |
| Math. 104 | 3(3-0) |
| Shades and Shadows | |
| Arch. 131 | 1(0-3) |
| College Rhetoric II | |
| Engl. 104 | 3(3-0) |
| Descriptive Geometry | |
| Ap. Mech. 158..... | 2(0-6) |
| Free-hand Drawing II | |
| Arch. 114 | 2(0-6) |
| Architectural Drawing II | |
| Arch. 109 | 2(0-6) |
| French II | |
| Mod. Lang. 162..... | 3(3-0) |
| Military Science C-II | |
| Mil. Tr. 142..... | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101..... | R |
| Physical Education M-II | |
| Phys. Ed. 104..... | R(0-2) |

SOPHOMORE

FIRST SEMESTER

| | |
|---------------------------------------|-----------|
| Engineering Physics I | |
| Physics 145 | 5(4-2, 1) |
| Advanced Composition I | |
| Engl. 113 | 2(2-0) |
| History of Architecture I | |
| Arch. 153 | 2(2-0) |
| Building Materials and Construction I | |
| Arch. 187 | 3(1-6) |
| Free-hand Drawing III | |
| Arch. 116 | 2(0-6) |
| Design I | |
| Arch. 142 | 3(0-9) |
| Military Science C-III | |
| Mil. Tr. 143..... | 1(0-4) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Physical Education M-III | |
| Phys. Ed. 105..... | R(0-2) |

SECOND SEMESTER

| | |
|--|-----------|
| Engineering Physics II | |
| Physics 150 | 5(4-2, 1) |
| Advanced Composition II | |
| Engl. 116 | 2(2-0) |
| History of Architecture II | |
| Arch. 156 | 2(2-0) |
| Building Materials and Construction II | |
| Arch. 189 | 3(1-6) |
| Free-hand Drawing IV | |
| Arch. 117 | 2(0-6) |
| Design II | |
| Arch. 144 | 3(0-9) |
| Military Science C-IV | |
| Mil. Tr. 144..... | 1(0-4) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Physical Education M-IV | |
| Phys. Ed. 106..... | R(0-2) |

JUNIOR

FIRST SEMESTER

| | |
|-----------------------------|---------|
| Applied Mechanics A-I | |
| Ap. Mech. 102..... | 3(3-0) |
| Theory of Structures I | |
| Arch. 192 | 4(1-9) |
| History of Architecture III | |
| Arch. 159 | 2(2-0) |
| Free-hand Drawing V | |
| Arch. 118 | 2(0-6) |
| Design III | |
| Arch. 145 | 5(0-15) |
| Mechanical Equipment | |
| Arch. 186 | 2(2-0) |
| Seminar | |
| Gen. Engr. 105..... | R |

SECOND SEMESTER

| | |
|----------------------------|---------|
| Applied Mechanics A-II | |
| Ap. Mech. 116, 121.... | 4(3-3) |
| Theory of Structures II | |
| Arch. 194 | 3(1-6) |
| History of Architecture IV | |
| Arch. 161 | 2(2-2) |
| Free-hand Drawing VI | |
| Arch. 120 | 2(0-6) |
| Design IV | |
| Arch. 147 | 5(0-15) |
| Business Law I | |
| Hist. 163 | 1(1-0) |
| Business Organization | |
| Econ. 106 | 1(1-0) |
| Seminar | |
| Gen. Engr. 105..... | R |

SENIOR

FIRST SEMESTER

| | |
|-----------------------------------|---------|
| History of Civilization and Art I | |
| Arch. 180 | 2(3-0) |
| Free-hand Drawing VII | |
| Arch. 121 | 2(0-6) |
| Design V | |
| Arch. 148 | 8(0-24) |
| Structural Design I | |
| Arch. 196 | 3(1-6) |
| Economics | |
| Econ. 101 | 3(3-0) |
| Seminar | |
| Gen. Engr. 105..... | R |

SECOND SEMESTER

| | |
|------------------------------------|---------|
| History of Civilization and Art II | |
| Arch. 184 | 2(3-0) |
| Free-hand Drawing VIII | |
| Arch. 123 | 2(0-6) |
| Design VI | |
| Arch. 151 | 8(0-24) |
| Structural Design II | |
| Arch. 198 | 3(1-6) |
| Engineering English | |
| Engl. 110 | 2(2-0) |
| Seminar | |
| Gen. Engr. 105..... | R |

Curriculum in Civil Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER

| | |
|------------------------|--------|
| Chemistry E-I | |
| Chem. 107 | 4(3-3) |
| Plane Trigonometry | |
| Math. 101 | 3(3-0) |
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Engineering Drawing | |
| Ap. Mech. 155 | 2(0-6) |
| Surveying I | |
| Civ. Engr. 102..... | 2(0-6) |
| Extempore Speech I | |
| Pub. Spk. 106..... | 2(2-0) |
| Military Science C-I | |
| Mil. Tr. 141..... | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101..... | R |
| Physical Education M-I | |
| Phys. Ed. 103..... | R(0-2) |

SECOND SEMESTER

| | |
|-------------------------|--------|
| Chemistry E-II | |
| Chem. 108 | 4(3-3) |
| College Algebra | |
| Math. 104 | 3(3-0) |
| College Rhetoric II | |
| Engl. 104 | 3(3-0) |
| Descriptive Geometry | |
| Ap. Mech. 158..... | 2(0-6) |
| Surveying II | |
| Civ. Engr. 111..... | 2(0-6) |
| Woodwork | |
| Shop 101 | 1(0-3) |
| Forging I | |
| Shop 150 | 1(0-3) |
| Military Science C-II | |
| Mil. Tr. 142..... | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101..... | R |
| Physical Education M-II | |
| Phys. Ed. 104..... | R(0-2) |

SOPHOMORE

FIRST SEMESTER

| | |
|-----------------------------|--------|
| Engineering Physics I | |
| Physics 145 | 5(4-3) |
| Plane Analytical Geometry | |
| Math. 110 | 4(4-0) |
| American Industrial History | |
| Hist. 105 | 3(3-0) |
| Surveying III | |
| Civ. Engr. 151, 155.... | 3(2-3) |
| Mechanical Drawing I | |
| Ap. Mech. 161..... | 2(0-6) |
| Military Science C-III | |
| Mil. Tr. 143..... | 1(0-4) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Physical Education M-III | |
| Phys. Ed. 105..... | R(0-2) |

SECOND SEMESTER

| | |
|-----------------------------|--------|
| Engineering Physics II | |
| Physics 150 | 5(4-3) |
| Calculus I | |
| Math. 113 | 5(5-0) |
| Metallurgy | |
| Shop 165 | 2(2-0) |
| Surveying IV | |
| Civ. Engr. 156, 157.... | 3(2-3) |
| Civil Engineering Drawing I | |
| Civ. Engr. 125 | 2(0-6) |
| Military Science C-IV | |
| Mil. Tr. 144..... | 1(0-4) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Physical Education M-IV | |
| Phys. Ed. 106..... | R(0-2) |

JUNIOR

FIRST SEMESTER

| | |
|-------------------------|--------|
| Applied Mechanics I | |
| Ap. Mech. 101, 105.... | 4(3-3) |
| Calculus II | |
| Math. 116 | 3(3-0) |
| Engineering Geology | |
| Geol. 102 | 4(2-6) |
| Masonry and Foundations | |
| Civ. Engr. 120..... | 2(2-0) |
| Economics | |
| Econ. 101 | 3(3-0) |
| Business Law I | |
| Hist. 163 | 1(1-0) |
| Seminar | |
| Gen. Engr. 105..... | R |

SECOND SEMESTER

| | |
|-----------------------------|--------|
| Applied Mechanics II | |
| Ap. Mech. 110, 120.... | 6(5-3) |
| Hydraulics | |
| Ap. Mech. 130, 135.... | 4(3-3) |
| Railway Engineering I | |
| Civ. Engr. 145..... | 2(2-0) |
| Drainage and Irrigation I | |
| Civ. Engr. 161 | 2(2-0) |
| Steam and Gas Engineering C | |
| Steam and Gas 120, 125, 126 | 3(2-3) |
| Seminar | |
| Gen. Engr. 105..... | R |

SENIOR

| FIRST SEMESTER | |
|------------------------------|--------|
| Bridge Stresses | |
| Civ. Engr. 201..... | 4(4-0) |
| Civil Engineering Drawing II | |
| Civ. Engr. 205..... | 2(0-6) |
| Astronomy and Geodesy | |
| Civ. Engr. 211, 216... | 4(2-6) |
| Water Supply | |
| Civ. Engr. 220..... | 2(2-0) |
| Sewerage | |
| Civ. Engr. 225..... | 2(2-0) |
| Highway Engineering I | |
| Civ. Engr. 230 and | |
| Ap. Mech. 250..... | 3(2-3) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Ap. Mech. 150 or | |
| Civ. Engr. 170..... | 1(0-3) |

| SECOND SEMESTER | |
|----------------------------|-----------|
| Bridge Design | |
| Civ. Engr. 246..... | 3(0-9) |
| Electrical Engineering C | |
| Elect. Engr. 160, 165... | 3(2-2, 1) |
| Engineering English | |
| Engl. 110 | 2(2-0) |
| Business Organization | |
| Econ. 106 | 1(1-0) |
| Concrete Design | |
| Civ. Engr. 250, 255.... | 3(2-3) |
| Railway Engineering II | |
| Civ. Engr. 260, 265.... | 4(2-6) or |
| Highway Engineering II | |
| Civ. Engr. 270, 275.... | 4(2-6) or |
| Drainage and Irrigation II | |
| Civ. Engr. 280, 285.... | 4(2-6) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Ap. Mech. 150 or | |
| Civ. Engr. 170..... | 2(0-6) |

Curriculum in Electrical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | |
|---------------------------------------|-----------|
| Chemistry E-I | |
| Chem. 107 | 4(3-3) |
| Plane Trigonometry | |
| Math. 101 | 3(3-0) |
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Engineering Drawing | |
| Ap. Mech. 155..... | 2(0-6) |
| Extempore Speech I | |
| Pub. Spk. 106..... | 2(2-0) |
| Electrical Machinery and Construction | |
| Elect. Engr. 170..... | 2(0-6) or |
| Surveying I | |
| Civ. Engr. 102..... | 2(0-6) |
| Military Science C-I | |
| Mil. Tr. 141..... | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101..... | R |
| Physical Education M-I | |
| Phys. Ed. 103..... | R(0-2) |

| SECOND SEMESTER | |
|---------------------------------------|-----------|
| Chemistry E-II | |
| Chem. 108 | 4(3-3) |
| College Algebra | |
| Math. 104 | 3(3-0) |
| College Rhetoric II | |
| Engl. 104 | 3(3-0) |
| Descriptive Geometry | |
| Ap. Mech. 158..... | 2(0-6) |
| Woodwork | |
| Shop 101 | 1(0-3) |
| Forging I | |
| Shop 150 | 1(0-3) |
| Surveying I | |
| Civ. Engr. 102..... | 2(0-6) or |
| Electrical Machinery and Construction | |
| Elect. Engr. 170..... | 2(0-6) |
| Military Science C-II | |
| Mil. Tr. 142..... | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101..... | R |
| Physical Education M-II | |
| Phys. Ed. 104..... | R(0-2) |

SOPHOMORE

FIRST SEMESTER

| | |
|---------------------------|--------|
| Engineering Physics I | |
| Physics 145 | 5(4-3) |
| Plane Analytical Geometry | |
| Math. 110 | 4(4-0) |
| Kinematics | |
| Ap. Mech. 180..... | 3(3-0) |
| Mechanical Drawing I | |
| Ap. Mech. 161..... | 2(0-6) |
| Metallurgy | |
| Shop 165 | 2(2-0) |
| Forging II | |
| Shop 155 | 1(0-3) |
| Military Science C-III | |
| Mil. Tr. 143 | 1(0-4) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Physical Education M-III | |
| Phys. Ed. 105..... | R(0-2) |

SECOND SEMESTER

| | |
|-----------------------------|--------|
| Engineering Physics II | |
| Physics 150 | 5(4-3) |
| Calculus I | |
| Math. 113 | 5(5 0) |
| American Industrial History | |
| Hist. 105 | 3(3 0) |
| Mechanical Drawing II | |
| Ap. Mech. 170..... | 3(0 9) |
| Foundry Practice | |
| Shop 160 | 1(0 3) |
| Military Science C-IV | |
| Mil. Tr. 144 | 1(0-4) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Physical Education M-IV | |
| Phys. Ed. 106..... | R(0-2) |

JUNIOR

FIRST SEMESTER

| | |
|---------------------------|-----------|
| Applied Mechanics I | |
| Ap. Mech. 101, 105.... | 4(3-3) |
| Calculus II | |
| Math. 116 | 3(3-0) |
| Economics | |
| Econ. 101 | 3(3-0) |
| Direct-Current Machines I | |
| Elect. Engr. 101, 105... | 4(3-2, 1) |
| Electrical Measurements | |
| Elect. Engr. 121, 126... | 2(1-2, 1) |
| Pattern Making | |
| Shop 145 | 1(0-3) |
| Seminar | |
| Gen. Engr. 105..... | R |

SECOND SEMESTER

| | |
|--------------------------------|-----------|
| Applied Mechanics E-II | |
| Ap. Mech. 115, 120.... | 4(3 3) |
| Hydraulics | |
| Ap. Mech. 130, 135.... | 4(3 3) |
| Direct-Current Machines II | |
| Elect. Engr. 110, 115... | 4(3-2, 1) |
| Alternating-Current Machines I | |
| Elect. Engr. 201, 205... | 3(2-2, 1) |
| Machine Tool Work I | |
| Shop 170 | 2(0 6) |
| Seminar | |
| Gen. Engr. 105..... | R |

SENIOR

FIRST SEMESTER

| | |
|---------------------------------|-----------|
| Steam and Gas Engineering I | |
| Steam and Gas 101, 105, | 5(4-3) |
| Alternating-Current Machines II | |
| Elect. Engr. 210, 215... | 6(4-4, 2) |
| Electrical Machine Design I | |
| Elect. Engr. 150..... | 1(0-3) |
| Telephony | |
| Elect. Engr. 220, 225... | 3(2-3) |
| Factory Engineering | |
| Shop 245, 250..... | 2(1-3) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Elect. Engr. 195..... | 1(0-3) |

SECOND SEMESTER

| | |
|------------------------------|--------|
| Steam and Gas Engineering II | |
| Steam and Gas 110, 115, | 4(3-3) |
| Electric Railways | |
| Elect. Engr. 240..... | 2(2-0) |
| Electrical Machine Design II | |
| Elect. Engr. 155..... | 2(0-6) |
| Illuminating Engineering | |
| Elect. Engr. 235, 236... | 3(2-3) |
| Business Law I | |
| Hist. 163 | 1(1-0) |
| Business Organization | |
| Econ. 106 | 1(1-0) |
| Engineering English | |
| Engl. 110 | 2(2-0) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Elect. Engr. 195..... | 2(0-6) |

Curriculum in Flour-mill Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | SECOND SEMESTER |
|---------------------------|---------------------------------|
| Chemistry E-I | Chemistry E-II |
| Chem. 107 4(3-3) | Chem. 108 4(3-3) |
| Plane Trigonometry | College Algebra |
| Math. 101 3(3-0) | Math. 104 3(3-0) |
| College Rhetoric I | College Rhetoric II |
| Engl. 101 3(3-0) | Engl. 104 3(3-0) |
| Extempore Speech I | |
| Pub. Spk. 106..... 2(2-0) | |
| Engineering Drawing | Descriptive Geometry |
| Ap. Mech. 155..... 2(0-6) | Ap. Mech. 158..... 2(0-6) |
| Woodwork | Elements of Steam and Gas Power |
| Shop 101 1(0-3) | Steam and Gas 130.... 2(0-6) |
| Forging I | Surveying I |
| Shop 150 1(0-3) | Civ. Engr. 102..... 2(0-6) |
| Military Science C-I | Military Science C-II |
| Mil. Tr. 141 1(0-4) | Mil. Tr. 142..... 1(0-4) |
| Engineering Lectures | Engineering Lectures |
| Gen. Engr. 101 R | Gen. Engr. 101..... R |
| Physical Education M-I | Physical Education M-II |
| Phys. Ed. 103..... R(0-2) | Phys. Ed. 104..... R(0-2) |

SOPHOMORE

| FIRST SEMESTER | SECOND SEMESTER |
|----------------------------|----------------------------|
| Engineering Physics I | Engineering Physics II |
| Physics 145 5(4-3) | Physics 150 5(4-3) |
| Plane Analytical Geometry | Calculus I |
| Math. 110 4(4-0) | Math. 113 5(5-0) |
| Organic Chemistry | Kinematics |
| Chem. 120 3(2-2, 1) | Ap. Mech. 180 3(3-0) |
| Business Law I | |
| Hist. 163 1(1-0) | |
| Mechanical Drawing I | Mechanical Drawing II |
| Ap. Mech. 161 2(0-6) | Ap. Mech. 170..... 3(0-9) |
| Quantitative Analysis I | Principles of Milling |
| Chem. 150 2(0-6) | Mill. Ind. 101..... 1(0-3) |
| Military Science C-III | Military Science C-IV |
| Mil. Tr. 143 1(0-4) | Mil. Tr. 144..... 1(0-4) |
| Seminar | Seminar |
| Gen. Engr. 105..... R | Gen. Engr. 105..... R |
| Physical Education M-III | Physical Education M-IV |
| Phys. Ed. 105..... R(0-2) | Phys. Ed. 106..... R(0-2) |

JUNIOR

| FIRST SEMESTER | SECOND SEMESTER |
|--------------------------------|-------------------------------|
| Applied Mechanics I | Applied Mechanics E-II |
| Ap. Mech. 101, 105.... 4(3-3) | Ap. Mech. 115, 120.... 4(3-3) |
| Calculus II | Hydraulics |
| Math. 116 3(3-0) | Ap. Mech. 130, 135.... 4(3-3) |
| Advanced Quantitative Analysis | Economics |
| Chem. 260 2(0-6) | Econ. 101 3(3-0) |
| Grain Crop Production | Grain Products |
| Agron. 101 3(2-3) | Mill. Ind. 103..... 2(2-0) |
| Grain Marketing | Milling Practice I |
| Mill. Ind. 102..... 3(3-2) | Mill. Ind. 109..... 3(1-6) |
| Machine Tool Work I | Milling Entomology |
| Shop 170 2(0-6) | Ent. 116 1(1-0) |
| Seminar | Seminar |
| Gen. Engr. 105..... R | Gen. Engr. 105..... R |

SENIOR

FIRST SEMESTER

| | |
|-----------------------------|--------|
| Wheat and Flour Testing | |
| Mill. Ind. 203..... | 4(1-9) |
| Flour Mill Design | |
| Ap. Mech. 215..... | 2(0-6) |
| Steam and Gas Engineering I | |
| Steam and Gas 101, 105, | 5(4-3) |
| American Industrial History | |
| Hist. 105 | 3(3-0) |
| Business Organization | |
| Econ. 106 | 1(1-0) |
| Factory Engineering | |
| Shop 245, 250..... | 2(1-3) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Ap. Mech. 150, Shop 195 or | |
| Steam and Gas 195.. | 1(0-3) |

SECOND SEMESTER

| | |
|---|-----------|
| Experimental Baking A | |
| Mill. Ind. 204..... | 2(0-6) |
| Milling Practice II | |
| Mill. Ind. 110..... | 2(0-6) |
| Steam and Gas Engineering II | |
| Steam and Gas 110, 115, | 4(3-3) |
| Refrigeration, Heating, and Ventilation | |
| Steam and Gas 210, 215, | 3(2-3) |
| Electrical Engineering C | |
| Elect. Engr. 160, 165... | 3(2-2, 1) |
| Engineering English | |
| Engl. 110 | 2(2-0) |
| Seminar | |
| Gen. Engr. 105..... | R |
| Thesis | |
| Ap. Mech. 150, Shop 195 or | |
| Steam and Gas 195.. | 2(0-6) |

Curriculum in Mechanical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER

| | |
|---------------------------------|--------|
| Chemistry E-I | |
| Chem. 107 | 4(3-3) |
| Plane Trigonometry | |
| Math. 101 | 3(3-0) |
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Engineering Drawing | |
| Ap. Mech. 155..... | 2(0-6) |
| Extempore Speech I | |
| Pub. Spk. 106..... | 2(2-0) |
| Woodwork | |
| Shop 101 | 1(0-3) |
| Forging I | |
| Shop 150 | 1(0-3) |
| Elements of Steam and Gas Power | |
| Steam and Gas 130.... | 2(0-6) |
| Military Science C-I | |
| Mil. Tr. 141..... | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101 | R |
| Physical Education M-I | |
| Phys. Ed. 103..... | R(0-2) |

SECOND SEMESTER

| | |
|---------------------------------|-----------|
| Chemistry E-II | |
| Chem. 108 | 4(3-3) |
| College Algebra | |
| Math. 104 | 3(3-0) |
| College Rhetoric II | |
| Engl. 104 | 3(3-0) |
| Descriptive Geometry | |
| Ap. Mech. 158..... | 2(0-6) |
| Surveying I | |
| Civ. Engr. 102..... | 2(0-6) |
| Elements of Steam and Gas Power | |
| Steam and Gas 130.... | 2(0-6) or |
| Woodwork | |
| Shop 101 | 1(0-3) |
| Forging I | |
| Shop 150 | 1(0-3) |
| Military Science C-II | |
| Mil. Tr. 142..... | 1(0-4) |
| Engineering Lectures | |
| Gen. Engr. 101..... | R |
| Physical Education M-II | |
| Phys. Ed. 104..... | R(0-2) |

or

SOPHOMORE

FIRST SEMESTER

| | |
|---------------------------|--------|
| Engineering Physics I | |
| Physics 145 | 5(4-3) |
| Plane Analytical Geometry | |
| Math. 110 | 4(4-0) |
| Kinematics | |
| Ap. Mech. 180 | 3(3-0) |
| Mechanical Drawing I | |
| Ap. Mech. 161 | 2(0-6) |
| Metallurgy | |
| Shop 165 | 2(2-0) |
| Forging II | |
| Shop 155 | 1(0-3) |
| Military Science C-III | |
| Mil. Tr. 143 | 1(0-3) |
| Seminar | |
| Gen. Engr. 105 | R |
| Physical Education M-III | |
| Phys. Ed. 105 | R(0-2) |

SECOND SEMESTER

| | |
|-----------------------------|--------|
| Engineering Physics II | |
| Physics 160 | 5(4-3) |
| Calculus I | |
| Math. 113 | 5(5-0) |
| American Industrial History | |
| Hist. 105 | 3(3-0) |
| Mechanical Drawing II | |
| Ap. Mech. 170 | 3(0-9) |
| Foundry Practice | |
| Shop 160 | 1(0-3) |
| Military Science C-IV | |
| Mil. Tr. 144 | 1(0-4) |
| Seminar | |
| Gen. Engr. 105 | R |
| Physical Education M-IV | |
| Phys. Ed. 106 | R(0-2) |

JUNIOR

FIRST SEMESTER

| | |
|-----------------------------|--------|
| Applied Mechanics I | |
| Ap. Mech. 101, 105 | 4(3-3) |
| Calculus II | |
| Math. 116 | 3(3-0) |
| Steam and Gas Engineering I | |
| Steam and Gas 101, 105, 5 | 4(3-3) |
| Business Law I | |
| Hist. 163 | 1(1-0) |
| Pattern Making | |
| Shop 145 | 1(0-3) |
| Graphic Statics | |
| Ap. Mech. 125 | 1(0-3) |
| Machine Tool Work I | |
| Shop 170 | 2(0-6) |
| Seminar | |
| Gen. Engr. 105 | R |

SECOND SEMESTER

| | |
|------------------------------|--------|
| Applied Mechanics II | |
| Ap. Mech. 110, 120 | 6(5-3) |
| Hydraulics | |
| Ap. Mech. 130, 135 | 4(3-3) |
| Steam and Gas Engineering II | |
| Steam and Gas 110, 115, 4 | 3(3-3) |
| Mechanical Drawing III | |
| Ap. Mech. 175 | 1(0-3) |
| Machine Tool Work II | |
| Shop 192 | 2(0-6) |
| Seminar | |
| Gen. Engr. 105 | R |

SENIOR

FIRST SEMESTER

| | |
|----------------------------|-----------|
| Electrical Engineering M-I | |
| Elect. Engr. 130, 135 | 4(3-2, 1) |
| Power Plant Engineering | |
| Steam and Gas 206 | 3(0-9) |
| Machine Design I | |
| Ap. Mech. 201, 205 | 5(3-6) |
| Factory Engineering | |
| Shop 245, 250 | 2(1-3) |
| Economics | |
| Econ. 101 | 3(3-0) |
| Seminar | |
| Gen. Engr. 105 | R |
| Thesis | |
| Ap. Mech. 150, Shop 195 or | |
| Steam and Gas 195 | 1(0-3) |

SECOND SEMESTER

| | |
|---|-----------|
| Electrical Engineering M-II | |
| Elect. Engr. 140, 145 | 4(3-2, 1) |
| Refrigeration, Heating, and Ventilation | |
| Steam and Gas 210, 215, 3 | (2-3) or |
| Aerodynamics | |
| Steam and Gas 220, 225, 3 | (2-3) |
| Machine Design II | |
| Ap. Mech. 210 | 2(0-6) |
| Factory Design | |
| Shop 255 | 2(0-6) or |
| Automotive Engineering | |
| Shop 196, 197 | 2(1-3) |
| Engineering English | |
| Engl. 110 | 2(2-0) |
| Business Organization | |
| Econ. 204 | 1(1-0) |
| Machine Tool Work III | |
| Shop 193 | 1(0-3) |
| Seminar | |
| Gen. Engr. 105 | R |
| Thesis | |
| Ap. Mech. 150, Shop 195 or | |
| Steam and Gas 195 | 2(0-6) |

Applied Mechanics and Machine Design

Dean SEATON
Associate Professor PEARCE
Associate Professor SCHOLER
Assistant Professor ROBERT
Assistant Professor WOJTASZAK

Assistant Professor DAWLEY
Instructor SMUTZ
Instructor DURLAND
Instructor HUNT
Instructor TEW
Instructor _____

The courses in applied mechanics deal with the applications of the laws of the mechanics of solids and liquids to the problems of engineering. Graphical and analytical methods of analysis are used for determining the forces acting on the parts of structures or machines, either at rest or in motion, and the effects of these forces in causing stresses, deformations, or motions of the parts.

The work is intended to be of a highly practical character, based on a sound theoretical training. For the purpose of fixing in the mind of the student the principles taught, the solution of a large number of problems is required. The principles are further illustrated by means of the laboratory and drafting-room work, which parallels the classroom instruction.

The laboratory exercises also permit the student to observe at first hand the behavior of materials, machines, and apparatus under test and to become familiar with testing apparatus and methods. All tests of a commercial character are conducted in accordance with the standard methods prescribed by the national societies. Complete reports are required on all laboratory exercises.

The courses in machine design deal with the mechanical transmission of power, the analysis of the action of machinery, the design of machines, and the application of the graphical language to engineering problems. The work in drawing and descriptive geometry develops the ability of the student to read and interpret drawings, to visualize objects in space, to express himself clearly and accurately in the graphical language, and to use these factors as an aid in the development of plans and in the analysis of problems. Commercial drafting-room methods of representation are used for all working drawings.

APPLIED MECHANICS LABORATORIES*

The strength of materials testing laboratory is provided with a number of universal testing machines, including a 200,000-pound Olsen machine with extension members for testing long beams and columns. Among the other pieces of apparatus are a 250,000-inch-pound torsion-testing machine, a beam-testing machine, an Upton-Lewis toughness-testing machine, a Brinnell hardness machine, a scleroscope, and a very complete equipment of extensometers and other auxiliary apparatus for use with these machines. A complete set of standard test weights from one grain to 600 pounds total capacity is provided for calibrating the weighing apparatus.

* These laboratories have been designated by law as the official testing laboratories for the State Highway Commission of Kansas.

The cement and concrete laboratory contains full equipment for making standard and research tests on cements, sands, gravels, and concretes, including several automatic shot cement-testing machines, sieves, needles, ovens, tanks, moist closets, scales, and a large number of briquette and cylindrical molds for test specimens. It also contains concrete building-block machines, and molds for various cast concrete products, such as drainage tile and fence posts.

The road materials testing laboratory contains apparatus for making all the usual tests and many special tests on stone, brick, and bituminous road materials. All of the equipment used in testing road materials for the Kansas Highway Commission is available for the use of students in special and advanced courses.

HYDRAULICS LABORATORY

The hydraulics laboratory contains two hydraulic pits each of 25,000 gallons capacity, equipped with various types of weirs, an air-pressure tank, hydraulic rams, several centrifugal pumps, one 15-inch Layne and Bowler three-stage deepwell centrifugal pump, a positive rotary pump, a deepwell reciprocating pump, a water motor, a Pelton-Doble water wheel, a Trump water turbine, current meters, electric motors for driving the pumps, and many pieces of small apparatus, such as an orifice tank, weirs, scales, tanks, hook gauges, pressure gauges, pressure regulators, water meters including a 6-inch Venturi meter, and manometers.

COURSES IN APPLIED MECHANICS

FOR UNDERGRADUATES

101. APPLIED MECHANICS I RECITATION. Junior year, first semester and summer school. Class work, three hours. Three semester credits. Prerequisites: Calculus I (Math. 113) and Engineering Physics II (Physics 212). Associate Professor Scholer, Assistant Professors Robert and Wojtaszak.

A study is made of the analytical and graphical composition, resolution, and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; friction; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motions; and of work, energy, and power. Text: *Poorman's Applied Mechanics*.

102. APPLIED MECHANICS A-I RECITATION. Junior year, first semester. Class work, three hours. Three semester credits. Prerequisites: Analytical Geometry (Math. 110), and Engineering Physics I (Physics 211). Assistant Professors Robert and Wojtaszak.

This course comprises a study of statics, with applications to stresses in structures; center of gravity; and moment of inertia. Algebraic methods are generally employed, supplemented by graphic construction and numerous examples.

105. APPLIED MECHANICS I LABORATORY. Junior year, first semester and summer school. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics I Recitation. Assistant Professors Robert, Wojtaszak, and Dawley.

Exercises are given in the calibration and use of laboratory measuring instruments and apparatus, such as micrometers, planimeters, dynamometers, platform scales, jacks, hoists and various types of testing machines. Standard tests are also made on cement. Text: Hatt and Schofield's *Laboratory Manual for Testing Materials*.

110. APPLIED MECHANICS II RECITATION. Junior year, second semester and summer school. Class work, five hours. Five semester credits. Prerequisite: Applied Mechanics I. Associate Professor Scholer and Assistant Professors Robert and Wojtaszak.

Behavior of materials subjected to tension, compression, and shear; riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of simple and continuous beams and cantilevers; bending moments and shear forces in beams; design of beams of wood, steel and reinforced concrete; design of built-up beams and box girders; resilience of beams; stresses in columns and hooks; and the design of columns of wood, steel and reinforced concrete. Texts: Boyd's *Strength of Materials* and Hool's *Reinforced Concrete Construction*, Vol. 1. *Cambria Steel* is used for reference.

115. APPLIED MECHANICS E-II RECITATION. Junior year, second semester and summer school. Class work, three hours. Three semester credits. Prerequisite: Applied Mechanics I. Associate Professor Scholer and Assistant Professors Robert and Wojtaszak.

The subject matter of this course is similar to that of Applied Mechanics II, but much less time is devoted to the study of continuous girders and of reinforced concrete. Text: Boyd's *Strength of Materials*. *Cambria Steel* is used for reference.

116. APPLIED MECHANICS A-II RECITATION. Junior year, second semester. Class work, three hours. Three semester credits. Prerequisites: Applied Mechanics A-I Recitation. Assistant Professors Robert and Wojtaszak.

Behavior of materials subjected to tension, compression, and shear; strength and stiffness of simple beams; moment and shear in flexure of beams, with diagrams; design of beams of wood, steel and reinforced concrete, and design and investigation of columns.

120. APPLIED MECHANICS II OR E-II LABORATORY. Junior year, second semester and summer school. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics II or E-II Recitation. Assistant Professors Robert, Wojtaszak, and Dawley.

Tension, compression, shear and bending tests are made on specimens of iron, steel, wood, and concrete. These include standard commercial tests and tests to determine the elastic properties of the materials. Torsion tests are also made on steel shafting. Standard tests are made on fine and coarse aggregates for concrete, and on brick.

121. APPLIED MECHANICS A-II LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics A-II Recitation. Assistant Professors Wojtaszak and Dawley.

This course comprises the use of micrometers, planimeters, and slide rules and a study of the various testing machines. Tension, compression, shear, and bending tests are made on specimens of iron, steel, wood, and concrete. Tests are also made on cement and on the fine and coarse aggregates for concrete.

125. GRAPHIC STATICS. Junior year, first semester. Drafting-room practice, supplemented by lectures, three hours. One semester credit. Must accompany or follow Applied Mechanics I or A-I. Assistant Professor Wojtaszak.

Graphical solutions are made of the stresses existing in a number of typical trusses, under a variety of loadings, and a detail design is made of one of the simpler forms of roof trusses.

130. HYDRAULICS RECITATION. Junior and senior years, both semesters. Class work, three hours. Three semester credits. Prerequisite: Applied Mechanics I. Assistant Professors Robert and Wojtaszak.

This course comprises a study of fluid pressure, stresses in containing vessels and pipes, center of pressure, immersion and flotation; Bernoulli's theorem, with applications; flow through orifices, weirs, short and long pipes; loss of head due to various causes; flow of water in open channels, and its measurement; Kutter's formula; impulse and reaction of a jet; elements of water power, impulse wheels, reaction turbines, and centrifugal pumps. Text: Daugherty's *Hydraulics*.

135. **HYDRAULICS LABORATORY.** Junior and senior years, both semesters. Laboratory work, three hours. One semester credit. Must accompany or follow Hydraulics Recitation (Ap. Mech. 130). Assistant Professors Robert and Wojtaszak.

Tests are made to determine the coefficients of weirs and orifices; use and calibration of water meters are studied; tests are taken to determine loss of head in pipes due to various causes, and tests are made on water wheels, water turbines, rams, and pumps.

140. **CONCRETE CONSTRUCTION RECITATION.** Senior year and elective, both semesters. Lectures and recitations, one hour. One semester credit. Assistant Professors Robert and Dawley.

Instruction is given in the principles governing the selection and preparation of materials, the proper proportioning of materials for different conditions, the construction of forms, mixing and handling concrete, elementary reinforced concrete construction, finishing concrete surfaces, stucco and plaster work, and the waterproofing and coloring of concrete. A brief study is made of the application of these principles to the making of concrete foundations, building blocks and bricks, posts, sidewalks, floors, tanks, cisterns, silos, and bridges and culverts. Text: Seaton's *Concrete Construction for Rural Communities*.

145. **CONCRETE CONSTRUCTION LABORATORY.** Senior year and elective, both semesters. Laboratory work, three hours. One semester credit. This course must accompany or follow Concrete Construction Recitation (Ap. Mech. 140). Assistant Professors Robert and Dawley.

Laboratory and field work is given in hand and machine mixing and handling of concrete, and in the construction of forms, for such objects as machine and building foundations, floors, sidewalks, fence posts, and building blocks. Tests are made on concrete cylinders and beams to illustrate the effect of different methods of treatment on the strength and reliability of plain and reinforced concrete.

150. **THESIS.** Senior year, continuing through the year. First semester: laboratory, three hours; one semester credit. Second semester: laboratory, six hours; two semester credits. Dean Seaton, Associate Professor Scholer, and Assistant Professor Robert.

The laboratories of the department furnish an excellent opportunity for experimental work in strength of materials, road materials, concrete and hydraulics, suitable for thesis projects of students in any branch of engineering. Projects in machine design may also be worked out as theses. The subject of the investigation should be selected in consultation with the head of the department at the beginning of the first semester of the senior year.

FOR GRADUATES AND UNDERGRADUATES

250. **HIGHWAY ENGINEERING I LABORATORY.** Senior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Applied Mechanics II Laboratory. Associate Professor Scholer.

This is a comprehensive course in the examination and testing of bituminous and nonbituminous road materials. Text: Blanchard's *Highway Engineers Handbook*.

255. ADVANCED APPLIED STATICS. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II or E-II. Dean Seaton and Associate Professor Scholer.

This course includes advanced problems in equilibrium of forces and stresses in framed structures, including certain statically indeterminate cases.

260. ADVANCED APPLIED KINETICS. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II or E-II. Dean Seaton and Assistant Professor Robert.

Advanced problems in kinetics are given with special attention to the kinetics of rigid bodies.

265. ADVANCED MECHANICS OF MATERIALS. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II or E-II. Dean Seaton or Associate Professor Scholer.

A study is made of the theory of elasticity and its applications, of elastic and masonry arches, and advanced problems in continuous girders involving the general three moment equations.

270. HYDRAULIC MACHINERY. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Hydraulics. Associate Professor Scholer and Assistant Professor Robert.

A study is made of the characteristics and applications of water wheels, turbines, pumps, and other hydraulic machinery.

275. ROAD MATERIALS. Elective, first or second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Highway Engineering I Laboratory. Associate Professor Scholer.

An advanced course in the properties and testing of the various materials used in road construction is here given.

FOR GRADUATES

301. RESEARCH IN MATERIALS OF CONSTRUCTION. Elective, first or second semester. One semester credit for each three hours of laboratory work. Dean Seaton and Associate Professor Scholer.

Many problems related to materials used in engineering construction offer attractive fields for research. A number of special pieces of apparatus in addition to the usual equipment of strength of materials laboratory are available for this work. The results of such investigations, if suitable, may be incorporated in bulletins of the Engineering Experiment Station.

This work may furnish material for the master's thesis.

COURSES IN DRAWING AND MACHINE DESIGN

FOR UNDERGRADUATES

155. ENGINEERING DRAWING. Freshman year, both semesters and summer school. Drafting, supplemented by lectures and recitations, six hours. Two semester credits. Mr. Smutz, Mr. Hunt, and Mr. Tew.

Instruction is given in the selection and use of drawing instruments, construction of geometrical figures, lettering, orthographic projections and sections, and pictorial methods of representation. Text: French's *Engineering Drawing*.

158. DESCRIPTIVE GEOMETRY. Freshman year, both semesters and summer school. Drafting practice with lectures and recitations, six hours. Two semester credits. Prerequisites: Engineering Drawing, and Solid Geometry. Mr. Smutz, Mr. Hunt, and Mr. Tew.

In this course, which is a continuation of Engineering Drawing, more advanced problems, involving the point, line, and plane; the intersection and development of the surfaces of geometric solids; single-curved, and double-curved surfaces, with their sections, tangents and tangent planes, as well as the practical applications of the principles involved, are studied. Emphasis is laid on developing the student's ability to visualize drawings in the third angle. Text: Higbee's *Essentials of Descriptive Geometry*.

161. MECHANICAL DRAWING I. Sophomore year, both semesters and summer school. Drafting, with lectures and recitations, six hours. Two semester credits. Prerequisite: Descriptive Geometry. Associate Professor Pearce, Mr. Durland, and Mr. Tew.

A study is made of conventional representations, working drawings, modern drafting-room systems, and the reproduction of drawings. Additional practice is given in the inclined Gothic and Reinhardt systems of lettering. Working drawings, both detail and assembly, are made from assigned plates. Special emphasis is given to the proper selection of views to present the necessary information in convenient forms, dimensioning, checking for errors, and the subject matter and arrangement of titles and notes. Text: French's *Engineering Drawing*.

170. MECHANICAL DRAWING II. Sophomore and junior years, second semester and summer school. Drafting, nine hours. Three semester credits. Prerequisites: Mechanical Drawing I. Kinematics (Ap. Mech. 180) must accompany or precede this course. Associate Professor Pearce, Mr. Durland, and Mr. Hunt.

About one-half of the time is occupied in making free-hand sketches of simple machine parts and complete working drawings from these sketches without further reference to the objects. At least one drawing is traced, and a blue print made from the tracing. The remainder of the semester is devoted to kinematic problems, including belting, cams, linkages, and gears to fulfill specified conditions. Center line drawings are first made, embodying the solution of the problems, and upon these are built working drawings of the machine parts. An effort is made to follow standard practice in the design of those details usually determined by empirical methods. Displacement and velocity diagrams are drawn for linkages and cams.

175. MECHANICAL DRAWING III. Junior year, second semester. Drafting, three hours. One semester credit. Prerequisite: Mechanical Drawing II and Steam and Gas Engineering I (Steam and Gas 101). Associate Professor Pearce.

This includes the solution of a problem on the slide valve by the Bilgram diagram, followed by the design, mostly by empirical methods, of the cylinder, piston, steam chest, and valve of a steam engine. All calculations and sketches are carefully kept in notebooks. Mark's *Mechanical Engineers' Handbook* is extensively used for reference. Manufacturers' catalogues and blue prints are also used for reference.

180. KINEMATICS. Sophomore and junior years, both semesters and summer school. Lectures and recitations, three hours. Three semester credits. Prerequisites: Plane Trigonometry (Math. 101) and Descriptive Geometry (Ap. Mech. 158). Associate Professor Pearce, and Mr. Durland.

A careful study is made of the fundamental elements of machinery with reference to the transmission of motion and force, and to their forms and arrangements in actual machines. Among the subjects discussed are: bearings; screws; worms and wheels; rolling cylinders, cones and discs; belts, ropes, and chains; cams, levers, and linkwork, with their motion, velocity, and force diagrams; special forms of linkages, such as quick

return and straight-line motions; gear-tooth outlines, and trains of gears. The solution of a large number of graphical and mathematical problems is required in this course. Text: Schwamb and Merrill's *Elements of Mechanism*.

FOR GRADUATES AND UNDERGRADUATES

201. MACHINE DESIGN I RECITATION. Senior year, first semester. Lectures and recitations, three hours. Three semester credits. Prerequisites: Applied Mechanics II and Mechanical Drawing II (Ap. Mech. 110, 170); Steam and Gas Engineering II (Steam and Gas 110). Must accompany Machine Design I Laboratory (Ap. Mech. 205). Associate Professor Pearce.

A study is made of the straining actions in machine elements in general, with special attention to the design of springs, riveted fastenings, screw fastenings, keys, force fits, cylinders, plates, journals, bearings, shafting, clutches, couplings, and belt, rope, chain and gear transmissions. Some time is devoted to a study of friction and lubrication, to the action of reciprocating parts in engines, and to the problems arising in the design of high-speed machinery. Text: Leutwiler's *Machine Design* and Lanza's *Dynamics of Machinery*.

205. MACHINE DESIGN I LABORATORY. Senior year, first semester. Drafting, six hours. Two semester credits. Must accompany Machine Design I Recitation (Ap. Mech. 201). Associate Professor Pearce.

A steam boiler is designed in strict conformity to the A. S. M. E. Boiler Code. Calculations are made for all parts except standard fittings, and working drawings are made. In the latter part of the course designs are made for a large pulley, shaft, and shaft coupling. All calculations and sketches are kept in notebooks.

210. MACHINE DESIGN II. Senior year, second semester. Drafting, six hours. Two semester credits. Prerequisites: Machine Design I (Ap. Mech. 201, 205). Associate Professor Pearce.

This is a continuation of Machine Design I Laboratory. A small power shear is designed. Calculations are made for all parts, and a graphical analysis is made of the stresses in the shaft. Working drawings are made.

215. FLOUR-MILL DESIGN. Senior year, first semester. Drafting, supplemented by lectures and assigned reading, six hours. Two semester credits. Prerequisites: Applied Mechanics E-II (Ap. Mech. 115) and Milling Practice I (Mill. Ind. 201). Associate Professor Pearce.

A design is made for a medium capacity flour mill, including the selection and the planning of the arrangement of the machinery.

FOR GRADUATES

355. ADVANCED MACHINE DESIGN. Elective first or second semester. One semester credit for each three hours of drafting-room work. Associate Professor Pearce.

One or more complete machines are designed. The necessary calculations and graphical and mathematical analyses are made, and commercial practices are investigated.

This course may furnish material for the master's thesis.

Architecture

Professor BAKER
Professor WALTERS (Emeritus)
Assistant Professor _____

Instructor LEE
Instructor DEHNER

The courses in architecture are offered not only to provide for the fundamental training necessary for the practice of architecture, but also to give the student a facility and working knowledge which will be of immediate value to him upon graduation. The foundation which the student acquires in college should be supplemented by continual professional study, especially during those years immediately following graduation, when it is desirable that he should acquire practical experience in the employ and under the guidance of capable and experienced members of the profession. Students are most urgently advised to acquire practical experience in an architect's office during the summer vacations of their college course.

Throughout the course the instruction by lectures, recitations and drafting-room practice is fully amplified and expanded by a free use of the equipment of the Department of Architecture. Within the department is housed a good working library of the standard architectural works and leading professional magazines, together with the collections of lantern slides and photographs, to all of which the student has free access. Placed about the amply lighted and well-equipped rooms of the department is a generous collection of plaster casts, including important examples of architectural fragments and ornament from historical monuments. On the walls of the drafting rooms, where they are constantly before the student, are hung selected examples from the department's collection of original drawings, including specimens of both academic and current professional work. From time to time this exhibit is changed.

At frequent intervals, representative men actually engaged in the practice of architecture and the allied arts and trades are invited to talk to and to advise the student. During the junior or senior year, under the direction of and in company with a member of the departmental faculty, each student is expected to make a visit to one or more of the neighboring cities, thus enabling him to acquaint himself with the representative work of the profession as well as with the operations and processes involved in the conduct of allied professions and industries.

All drawings or designs made during the student's course are to become the property of the department, to be used or returned at the discretion of the faculty.

COURSES IN ARCHITECTURE

FOR UNDERGRADUATES

108. ARCHITECTURAL DRAWING I. Freshman year, first semester. Drafting room, six hours. Two semester credits. Professor Baker and Mr. Lee.

This course is outlined to give the student a working knowledge of architectural drafting-room practice, with a view to fitting him to enter an architect's office his first summer in college. The work covers the different methods of presenting architectural drawings, lettering, and the various symbols used in architectural practice. Special attention is given to the study of fundamental forms and their presentation.

109. ARCHITECTURAL DRAWING II. Freshman year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Course 108. Professor Baker and Mr. Lee.

This is a continuation of Architectural Drawing I, and consists of a more detailed study of architectural forms, in preparation for Design I in the sophomore year. Text: Pierre Esquire's *Traite Elementaire d'Architecture Comprenant l'Etude Complete des Cinq Ordres*.

111. FREE-HAND DRAWING I. Freshman year, first semester. Drafting room, six hours. Two semester credits. Mr. Dehner.

This course comprises the drawing of simple objects and groups as exercises in developing the powers of observation as well as in training the hand. Special attention is given to representations of the third dimension.

114. FREE-HAND DRAWING II. Freshman year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 111. Mr. Dehner.

This is an amplification and expansion of the principles taught in Free-hand Drawing I, as applied to architectural forms and architectural ornament. The work consists of drawing in charcoal or pencil from casts.

116. FREE-HAND DRAWING III. Sophomore year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 114. Mr. Dehner.

This is a continuation of Free-hand Drawing II, and consists of drawing from casts of architectural ornament and of the human figure, with occasional exercises in rapid sketching, both indoors and out.

117. FREE-HAND DRAWING IV. Sophomore year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 116. Mr. Dehner.

In this course Free-hand Drawing III is continued, with the addition of some work in water color.

118. FREE-HAND DRAWING V. Junior year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 117. Mr. Dehner.

This is a continuation of Free-hand Drawing III and IV, and consists of a more detailed study and rendering in charcoal of architectural ornament and the human figure. More attention is paid than in the previous course to rapid sketching in pencil and in pen and ink.

120. FREE-HAND DRAWING VI. Junior year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 118. Mr. Dehner.

In this course Free-hand Drawing V is continued, substituting additional work in water color for the pencil and pen and ink sketching.

121. FREE-HAND DRAWING VII. Senior year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 120. Mr. Dehner.

This is a continuation of Free-hand Drawing V and VI, but more time is devoted to the drawing, in various mediums, of the human figure.

123. FREE-HAND DRAWING VIII. Senior year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 121. Mr. Dehner.

This is a continuation of Free-hand Drawing VII, with the addition of some work in original composition.

128. PERSPECTIVE. Freshman year, first semester. Drafting room, three hours. One semester credit. To be taken simultaneously with Ap. Mech. 155 and Arch. 108. Mr. Lee.

This course, consisting of drafting-room exercises and examinations, covers the study and practical application of the theory of perspective as related to architectural practice. In the latter part of the course drafting-room exercises are given to train the student to visualize, in perspective, objects represented in orthographic projection.

131. SHADES AND SHADOWS. Freshman year, second semester. Drafting room, three hours. One semester credit. Prerequisites: Ap. Mech. 155, and Arch. 108. To be taken simultaneously with Ap. Mech. 158 and Arch. 109. Mr. Lee.

The course consists of a series of drafting-room exercises and examinations, applying the principles of descriptive geometry in casting conventional architectural shadows. In these exercises the student is required to give careful consideration to the elemental architectural forms and principles of rendering used in his study of this subject. Text: McGoodwin's *Architectural Shades and Shadows*.

142. DESIGN I. Sophomore year, first semester. Drafting room, nine hours. Three semester credits. Prerequisites: Arch. 114, 127 and 130. Professor Baker and Mr. Lee.

This course is outlined to develop the student's understanding of architectural composition and his ability to present architectural conceptions, thus laying the foundation for his esthetic training. By means of problems in original design, accompanied by a constant study and analysis of the best historical examples, the student is led to develop his sense of proportion and conception of beauty, at the same time acquiring through the training of hand and eye a facility in architectural composition and rendering. In this course each student receives individual instruction, accompanied by frequent criticisms of students' work before the entire class.

144. DESIGN II. Sophomore year, second semester. Drafting room, nine hours. Three semester credits. Prerequisite: Arch. 142. Professor Baker and Mr. Lee.

In this course Design I is continued.

145. DESIGN III. Junior year, first semester. Drafting room, fifteen hours. Five semester credits. Prerequisites: Arch. 117 and 144. Professor Baker.

This is a continuation of Design I and II. At frequent intervals during the year, time problems or rapid design sketches are required to test the student's development and to give him practice in clear and concise expression. It is also required that at least one problem be presented in perspective.

147. DESIGN IV. Junior year, second semester. Drafting room, fifteen hours. Five semester credits. Prerequisites: Arch. 145. Professor Baker.

In this course Design III is continued.

148. DESIGN V. Senior year, first semester. Drafting room, twenty-four hours. Eight semester credits. Prerequisites: Arch. 120 and 147. Professor Baker.

In this course Design IV is continued.

151. DESIGN VI. Senior year, second semester. Drafting room, twenty-four hours. Eight semester credits. Prerequisite: Arch. 148. Professor Baker.

In this course Design V is continued.

153. HISTORY OF ARCHITECTURE I. Sophomore year, first semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 114. Mr. Lee.

This is a lecture and recitation course covering the history of architecture from the dawn of civilization to the end of the Roman Empire. Throughout the courses in the history of architecture the relation of architecture to the development of civilization is constantly emphasized. The lectures are given with the aid of lantern slides, and written papers, with sketches, are required of each student.

156. HISTORY OF ARCHITECTURE II. Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 153. Mr. Lee.

This course continues History of Architecture I and covers the period from the end of the Roman Empire to the end of the Gothic Period.

159. HISTORY OF ARCHITECTURE III. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisites: Arch. 117 and 156. Mr. Lee.

This course continues History of Architecture II and covers the Italian and French Renaissance period.

161. HISTORY OF ARCHITECTURE IV. Junior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 159. Mr. Lee.

This course continues History of Architecture III and finishes the Renaissance period to modern times.

180. HISTORY OF CIVILIZATION AND ART I. Senior year, first semester. Lectures, three hours. Two semester credits. Prerequisite: Arch. 161. Professor Baker.

This course comprises a survey of civilization from earliest history, laying special emphasis on the Hellenistic, Roman, and Gothic periods, and tracing the economic, political, racial, and religious phases of history simultaneously with the artistic developments of each epoch. The course consists of lectures, recitations, written papers, and research, the accomplishment of which is greatly aided by a free use of lantern slides, photographs, and library references.

184. HISTORY OF CIVILIZATION AND ART II. Senior year, second semester. Lectures, three hours. Two semester credits. Prerequisite: Arch. 180. Professor Baker.

In this course History of Civilization and Art I is continued to the close of the Renaissance.

186. MECHANICAL EQUIPMENT. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 189. Mr. Lee.

This is a course dealing with the heating, ventilating, plumbing, and electrical installations of modern buildings. The work covers the fundamental principles of each type of installation, together with practical problems in their application to buildings.

187. BUILDING MATERIALS AND CONSTRUCTION I. Sophomore year, first semester. Class work, one hour; drafting room, six hours. Three semester credits. Prerequisite: Arch. 109. To be taken simultaneously with Arch. 142. Assistant Professor ———.

This course takes up the study of the properties and uses of the materials of construction. Attention is also given to the properties of these materials in their relation to design. Working drawings involving various materials and types of construction are executed in the drafting period, covering the same field that is studied in the classroom work. Specifications to accompany the working drawings are also required. Occasional visits to buildings under construction are made, to familiarize the student with various forms of construction and with the methods employed in building operations.

189. BUILDING MATERIALS AND CONSTRUCTION II. Sophomore year, second semester. Class work, one hour; drafting room, six hours. Three semester credits. Prerequisite: Arch. 187. Assistant Professor ———.

This is a continuation of Building Materials and Construction I.

192. THEORY OF STRUCTURES I. Junior year, first semester. Class work, one hour; drafting room, nine hours. Four semester credits. Prerequisite: Arch. 189. Must be taken simultaneously with or subsequent to Ap. Mech. 102. Assistant Professor ———.

This course is devoted to the study of the theory of building construction, and the study of the different materials to resist stresses. The problems taken up in the classroom are applied to practical solutions in the drafting-room work. Special emphasis is laid upon the graphic presentation of forces.

194. THEORY OF STRUCTURES II. Junior year, second semester. Class work, one hour; drafting room, six hours. Three semester credits. Prerequisite: Arch. 192. Must be taken simultaneously with or subsequent to Ap. Mech. 116, 121. Assistant Professor ———.

This is a continuation of Theory of Construction I.

196. STRUCTURAL DESIGN I. Senior year, first semester. Class work, one hour; drafting room, six hours. Three semester credits. Prerequisite: Arch. 194. Assistant Professor ———.

This course, in both classroom work and in the drafting room, consists of the solution of problems in construction, special emphasis being placed upon fireproof construction. A study is made of the various types of fireproof construction, and the advantages of each type are carefully considered.

198. STRUCTURAL DESIGN II. Senior year, second semester. Class work, one hour; drafting room, six hours. Three semester credits. Prerequisite: Arch. 196. Assistant Professor ———.

This is a continuation of Structural Design I.

FOR GRADUATES

301. ADVANCED DESIGN I. Elective, first semester. Drafting room, thirty hours. Ten semester credits. Professor Baker.

In this course a study of the planning of important buildings and groups of buildings is made, together with occasional rapid-sketch problems of minor buildings or plan projects.

304. ADVANCED DESIGN II. Elective, second semester. Drafting room, thirty hours. Ten semester credits. Professor Baker.

This is a continuation of Advanced Design I.

308. ADVANCED FREE-HAND DRAWING I. Elective, first semester. Drafting room, six hours. Two semester credits. Professor Baker.

This course includes the study of the human figure and exercises in original composition of architectural ornament. Work is done in various mediums.

312. ADVANCED FREE-HAND DRAWING II. Elective, second semester. Drafting room, six hours. Two semester credits. Professor Baker.

This is a continuation of Advanced Free-hand Drawing I.

316. ADVANCED HISTORY OF CIVILIZATION AND ART I. Elective, first semester. Class work, two hours. Two semester credits. Professor Baker.

This course comprises a survey of civilization from the Roman Empire to the present time, tracing the economic, political, racial, and religious phases of history simultaneously with the artistic developments of each epoch. Instruction is by means of lectures, recitations, written papers, and research.

320. ADVANCED HISTORY OF CIVILIZATION AND ART II. Elective, second semester. Class work, two hours. Two semester credits. Professor Baker.

This is a continuation of Advanced History of Civilization and Art I.

324. RESEARCH IN ARCHITECTURE. Elective, first and second semesters. Drafting-room or class work. Credit as determined by Professor Baker and Graduate Council.

This course comprises the study of a research problem in architecture, determined by conferences between Professor Baker and the student, and approved by the Graduate Council.

Civil Engineering

Professor CONRAD
Associate Professor FRAZIER
Assistant Professor FURR

Assistant Professor WHITE
Instructor FOX

The purpose of the instruction in the Department of Civil Engineering is to give the student a thorough knowledge of the fundamental principles of engineering and to develop his ability to analyze engineering problems, and thus prepare the graduate to enter any one of the many special fields which are usually included under the title of civil engineering.

The instruction is given by means of lectures and recitations, and by practice in the field, in the drafting room, and in the laboratory.

The technical work begins in the freshman year with courses in drafting and in elementary and land surveying. In the sophomore year courses are given in civil engineering drawing and in topographic, hydrographic, city, and mine surveying, and in railroad curves and earthwork. The heaviest technical civil engineering work falls in the junior and senior years, during which time courses are given in civil engineering drawing, stresses in framed structures, structural steel and concrete design, drainage and irrigation engineering, design and construction of masonry and foundations, railway engineering, highway engineering, sewerage, water supply, astronomy and geodesy. Courses in the fundamental principles of electrical engineering and mechanical engineering are required. Considerable time is devoted also to thesis work.

The seminar, through discussions, references to current periodicals, and lectures by prominent engineers, affords the student an opportunity to become acquainted with modern engineering practice.

In addition to the laboratory equipment of the other engineering departments, which is available to civil engineering students, the Department of Civil Engineering possesses a good assortment of transits, levels, plane tables, compasses, tapes, and chains. It also owns a precise level, a direction theodolite, a repeating theodolite, four different kinds of solar attachments, and a base-line outfit.

A recording gauge makes a continuous record of the stage of the Kansas river, to be used to compute the flood discharge of that stream. The information thus obtained will be of great value in future years as a basis for designing works for flood protection.

COURSES IN CIVIL ENGINEERING

FOR UNDERGRADUATES

102. SURVEYING I. Freshman year, both semesters. Field work, plotting, and supervised study, six hours. Two semester credits. Prerequisite or parallel: Plane Trigonometry (Math. 101). Associate Professor Frazier, Assistant Professors Furr and White, and Mr. Fox.

This is a brief course in the use and care of engineers' surveying instruments. Text: Breed and Hosmer's *Surveying*, Vol. I.

111. SURVEYING II. Freshman year, both semesters. Field work, plotting and supervised study, six hours. Two semester credits. Prerequisite: Surveying I. Assistant Professors Furr and White.

The course is devoted to land and topographic surveying. Text: Breed and Hosmer's *Surveying*, Vol. I.

120. MASONRY AND FOUNDATIONS. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Engineering Physics II (Physics 150); Applied Mechanics I (Ap. Mech. 101, 105) must be taken with this course or precede it. Associate Professor Frazier.

In this course a study is made of the principles underlying the design and construction of foundations, the stresses in plain masonry structures, and the method of designing such structures. Text: Baker's *Treatise on Masonry Construction*.

125. CIVIL ENGINEERING DRAWING I. Sophomore year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Mechanical Drawing I (Ap. Mech. 160, 165.) Associate Professor Frazier.

This course is devoted to the application of stereotomy, shades and shadows, isometric and perspective drawing, and copying working drawings of engineering structures. The principles are explained to the students by such short lectures as seem necessary for the purpose. No textbook is used.

130. ELEMENTS OF IRRIGATION AND DRAINAGE RECITATION. Elective, first semester. Class work, two hours a week for the first half of the semester. One semester credit. No prerequisite. Associate Professor Frazier.

This course comprises a brief treatment of the subjects from the agriculturist's point of view. Texts: Elliott's *Engineering for Land Drainage*, and Fortier's *Use of Water in Irrigation*.

135. ELEMENTS OF IRRIGATION AND DRAINAGE LABORATORY. Elective, first semester. Field work, six hours a week for the second half of the semester. One semester credit. No prerequisite. Associate Professor Frazier.

Practice work in the field and drafting room is devoted to the laying out and plotting of simple farm drainage and irrigation systems. Texts: Same as in Civ. Engr. 130.

145. RAILWAY ENGINEERING I. Junior year, second semester. Class work, two hours. Two semester credits. Prerequisites: Surveying IV and Civil Engineering Drawing I (Civ. Engr. 111, 125). Associate Professor Frazier.

This is a short course in the theory of railway engineering based on Wellington's economic theory. Considerable time is also devoted to the study of track construction and maintenance, and to the design of yards and terminals. Texts: Raymond's *Elements of Railroad Engineering*.

151. SURVEYING III RECITATION. Sophomore year, first semester. Class work, two hours. Two semester credits. Prerequisite: Surveying II. Assistant Professor Furr.

This course comprises a study of topographic, hydrographic, city, and mine surveying. Text: Breed and Hosmer's *Surveying*, Vols. I and II.

155. SURVEYING III LABORATORY. Sophomore year, first semester. Field and drafting-room work, three hours. One semester credit. Prerequisite: Surveying II Laboratory. Assistant Professor Furr.

The field exercises are devoted to practice work in topographic surveying. Time in the drafting room is devoted principally to topographic mapping. Texts: Same as in Civ. Engr. 151.

156. SURVEYING IV RECITATION. Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Surveying III. Assistant Professor Furr.

This course is devoted to a study of railroad curves and earthwork. Text: Allen's *Railroad Curves and Earthwork*, with tables.

157. SURVEYING IV LABORATORY. Sophomore year, second semester. Field and drawing room, three hours. One semester credit. Prerequisite: Surveying III. Assistant Professor Furr.

The time is devoted to field and drafting room exercises in railroad curves and earthwork.

161. DRAINAGE AND IRRIGATION I. Junior year, second semester. Class work, two hours. Two semester credits. Hydraulics (Ap. Mech. 130) must be taken with this course or precede it. Professor Conrad.

In this course a study is made of the application of engineering principles to the design and construction of drainage and irrigation works. Considerable attention is paid to the development of ground-water supplies for irrigation. Texts: Elliott's *Engineering for Land Drainage*, and Newell and Murphy's *Principles of Irrigation Engineering*.

170. THESIS. Senior year, continuing through both semesters. First semester, three hours; one semester credit. Second semester, six hours; two semester credits. Professor Conrad.

All candidates for the degree of Bachelor of Science in civil engineering are required, during their senior year, to prepare a thesis, or to do an equivalent amount of work in an elective subject approved by the Dean of Engineering. This thesis may be a report on a proposed design, an original investigation, or a library research. Civil engineering students may, with the approval of the head of the department, take their thesis work outside of the department. The thesis subject may be selected and approved by the head of the department in which the work is done before October first next preceding the commencement at which the candidate proposes to graduate.

FOR GRADUATES AND UNDERGRADUATES

201. BRIDGE STRESSES. Senior year, first semester. Class work, four hours. Four semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Conrad.

This course involves a study of the methods of computing the stresses in bridges, leading up to the subject of bridge design in the following semester. Text: Merriman and Jacoby's *Roofs and Bridges*, Part I.

205. CIVIL ENGINEERING DRAWING II. Senior year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Civil Engineering Drawing I (Civ. Engr. 125). Professor Conrad.

This course is devoted to graphic statics and the design of simple roof trusses in timber and steel. Text: Merriman and Jacoby's *Roofs and Bridges*, Part II.

211. ASTRONOMY AND GEODESY RECITATION. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Surveying III. Associate Professor Frazier.

This is a brief course in the elements of practical astronomy, followed by a study of the precise methods of surveying and leveling.

216. ASTRONOMY AND GEODESY LABORATORY. Senior year, first semester. Field work, six hours. Two semester credits. Prerequisite: Surveying III Laboratory. Associate Professor Frazier.

The work is devoted to simple astronomical observations, principally for determining the true meridian and latitude; to base-line measurements and triangulation work. Each student is also required to run a short circuit with the precise level.

220. WATER SUPPLY. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Hydraulics (Ap. Mech. 130). Associate Professor Frazier.

The course deals with the water supply for cities from the standpoints of consumption, collection, storage, distribution, and purification.

225. SEWERAGE. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Hydraulics (Ap. Mech. 130). Associate Professor Frazier.

A study is made of the problems met in the design and construction of sewer systems and disposal plants for cities of moderate size. Text: Folwell's *Sewerage*.

230. HIGHWAY ENGINEERING I RECITATION. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Assistant Professor Furr.

A study is made of the principles underlying the location, construction, and maintenance of all ordinary types of roads and pavements. Text: Agg's *Construction of Roads and Pavements*. (For the laboratory work in connection with this course, see Ap. Mech. 250.)

246. BRIDGE DESIGN. Senior year, second semester. Drawing, nine hours. Three semester credits. Prerequisite: Bridge Stresses (Civ. Engr. 201). Professor Conrad.

This course comprises the making of general drawings for a highway truss bridge, a railroad truss bridge, and a railroad deck plate girder. Text: Merriman and Jacoby's *Roofs and Bridges*, Part III.

250. CONCRETE DESIGN RECITATION. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Conrad.

An application of the principles of reinforced concrete to the design of chimneys, buildings, retaining walls, dams, and bridges. Text: *Concrete Engineers' Handbook*, by Hool and Johnson.

255. CONCRETE DESIGN LABORATORY. Senior year, second semester. Drafting-room work, three hours. One semester credit. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Conrad.

In this course the students make drawings of reinforced concrete retaining walls, dams, slab and girder bridges, and arch bridges. Text: *Concrete Engineers' Handbook*, by Hool and Johnson.

260. RAILWAY ENGINEERING II RECITATION. Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Railway Engineering I (Civ. Engr. 145). Associate Professor Frazier.

This course comprises the study of railway operation and maintenance.

265. RAILWAY ENGINEERING II LABORATORY. Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Prerequisite: Railway Engineering I (Civ. Engr. 145). Associate Professor Frazier.

In the field, reconnoissance and survey of a short railroad is made, and the office work consists in making the maps, profiles, and estimates from the survey. Text: Allen's *Railroad Curves and Earthwork*, with tables.

270. HIGHWAY ENGINEERING II RECITATION. Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Highway Engineering I (Civ. Engr. 230). Assistant Professor Furr.

This course consists in a study of highway laws, highway administration in the various states, and highway economics.

275. HIGHWAY ENGINEERING II LABORATORY. Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Prerequisite: Highway Engineering I (Civ. Engr. 230). Assistant Professor Furr.

In the field, a reconnoissance and survey for a highway a few miles long is made. The work in the drafting room consists in making the maps, profiles, and estimates from the survey.

280. DRAINAGE AND IRRIGATION II RECITATION. Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Drainage and Irrigation I. Professor Conrad.

A continuation of the former course in Drainage and Irrigation, dealing with the design of irrigation structures and the management of irrigation projects.

285. DRAINAGE AND IRRIGATION II LABORATORY. Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Professor Conrad.

The field work consists in making the survey for a drainage or irrigation project. In the office the maps, estimates, and designs are made, using the survey as a basis.

Electrical Engineering

Professor REID
Associate Professor KLOEFFLER

Assistant Professor BRENNEMAN
Instructor BECKWITH

Instruction in this department is given by means of textbooks, lectures, reference work, and laboratory practice. The class work is illustrated by means of demonstration apparatus and the projection lantern.

The electrical measurement and calibration laboratory is provided with standard instruments of measurement, including standards of resistance, and electromotive force, self-induction, and capacity, Wheatstone bridges, and potentiometers. More than 100 ammeters, voltmeters, and wattmeters, with 250 ranges, of the best types of American and foreign manufacture, are available for use. The instrument equipment includes also frequency meters, a synchroscope, a power factor meter, electric, magnetic, centrifugal and liquid tachometers, slip meters, a Tirrill voltage regulator, current and potential transformers, electrostatic voltmeters, and rotating standard test meters.

The modern equipment contained in the telephone laboratory has been made possible through the liberal coöperation of various telephone companies. It includes a Western Electric demonstration panel, containing all parts and circuits for connecting two subscribers through the A board and B board of the multi-office exchange; a Swedish-American magneto

wall switchboard; two demonstrating panels of the Stromberg-Carlson type, one containing all the parts and circuits for the magneto switchboard and the other the same for common battery board. A complete line of bridging magneto and common battery wall telephone sets of all above-mentioned makes, including those of the Kellogg Switchboard and Supply Company, Monarch Telephone Company, and the Leigh-Cracraft Company, are to be found in the laboratory. In addition there are series telephone sets, desk telephones, various individual telephone parts and potentiometer boards, for making transmission efficiency tests.

For the freshman course in wiring, the upper floor of one of the barracks has been set aside for practice. Sixteen booths are built in imitation of a building in course of construction, in which the students actually install wiring in four different styles of construction. The department has provided about 150 switches of thirty different styles, and a very good assortment of parts and fittings for cleat wiring, concealed knob and tube wiring, conduit and also conduit constructions.

The machine, instrument, and general apparatus equipment of the department is unusually complete. More than forty generators and motors, both alternating and direct current, from one kilowatt to thirty kilowatts in size, and totaling 350 horsepower, are available for the use of students receiving instruction in the electrical laboratories. In addition, there are eight machines ranging from five to thirty-five kilowatts, complete except windings, available for instruction in armature and field winding.

The above machine equipment includes a 30-kilowatt, 2,300-volt, poly-phase alternating-current generator, a 15-kilowatt, 125-volt, alternating-current generator, which may be connected as a single-phase, two-phase, three-phase, six-phase, or twelve-phase machine; a 7½-kilowatt synchronous converter, which may be used as a one-, two-, three-, or quarter-phase motor; a 10-kilowatt special synchronous converter, designed for use in single-, three-, or six-phase operation, equipped with amortisseur winding, speed limiting and oscillating devices, series winding and commutating poles. Three 5-kilowatt transformers are accessories of this machine. A pair of 6-kilowatt compound-wound generators is used as a balancer set on the Edison 3-wire system, supplying the laboratory with 110 volts, from the 220-volt power supply, and to illustrate commercial use of such systems. Two compound-wound generators on the same sub-base, direct-connected to the motor, are used to illustrate commercial use of generators in parallel operation, Edison 3-wire system, and "pump-back" factory efficiency tests.

A set of four machines, mounted on a common bed-plate, includes two 7½-kilowatt alternating-current generators, and two 15-horsepower direct-current motors, whose speed is variable from 600 to 1,800 revolutions. By means of flanged couplings, any combination of two, three, or four machines may be operated. The generator armature windings are brought out to twelve terminals, and each may be connected as a single-, two-, or three-phase Y or delta, six-phase or twelve-phase machine, and when running in synchronism, the armatures of the two machines may be turned with reference to each other through 180 degrees, so that any desired phase difference may be obtained. These alternators may be used

in parallel, as synchronous motors, in meter testing to produce an artificial power factor, and many other combinations.

Accessory apparatus includes field and starting rheostats and controllers, load racks, and banks of lamps, inductive and capacity loads, 20,000- and 60,000-volt testing transformers, arc and spot welding equipment, a 3-element oscillograph with photograph attachments, with which simultaneous waves of three electric currents or voltage may be observed and photographed, a mercury arc rectifier, a constant current transformer, and a 110-volt, 75 ampere-hour Edison storage battery.

Through the generous assistance of the Westinghouse Electric and Manufacturing Company, the department has been able to install a very complete electric railway test set, consisting of two street-railway motors of a most recent design and a complete control equipment of the H L type. The motors are mounted on and geared to a shaft, on which are a flywheel and brake pulley. The flywheel requires as much energy to accelerate as does a 10-ton car, and the brake load may be adjusted to reproduce any desired load on car and condition of track. The H L control equipment includes the master controller, and electrically controlled, air-operated unit switches. It is the type used on many single cars and multiple-car trains on surface, elevated and subway roads, and also in many of the modern steam road electrifications.

COURSES IN ELECTRICAL ENGINEERING

FOR UNDERGRADUATES

101. DIRECT-CURRENT MACHINES I RECITATION. Junior year, first semester. Recitations or lectures, three hours. Three semester credits. Prerequisites: Calculus I (Math. 113) and Engineering Physics II (Physics 212). Associate Professor Kloeffer and Assistant Professor Brenneman.

The work consists of a detailed study of the fundamental principles of magnetic and electric circuits and their application to the various types of direct-current machines. Numerous problems involving the application of the principles are given as a part of the course. The class work is planned to coordinate with the work in the electrical engineering laboratory. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. I.

105. DIRECT-CURRENT MACHINES I LABORATORY. Junior year, first semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Direct-Current Machines I Recitation. Associate Professor Kloeffer.

A series of experiments is outlined which is designed to necessitate careful, accurate measurement. The student is obliged to make all electrical connections with the necessary instruments in the circuit, and to record the required data. From the laboratory records a written report upon each experiment or test must be submitted. The laboratory exercises include tests for armature and field resistance, potential curves, machine characteristics, motor and generator efficiencies. Text: Swenson and Frankenfield's *Testing of Electromagnetic Machinery*, Vol. I.

110. DIRECT-CURRENT MACHINES II RECITATIONS. Junior year, second semester. Lectures or recitations, three hours. Three semester credits. Prerequisites: Direct-Current Machines I, and Electrical Measurements. Associate Professor Kloeffer.

This course is a continuation of Direct-Current Machines I. It involves a detailed study of the various types of direct-current machinery

with respect to theory and operation. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. I.

The latter part of the course is devoted to a study of the construction and testing of the various types of voltmeters, ammeters, wattmeters, and watt-hour meters. Text: Jansky's *Electrical Meters*.

115. DIRECT-CURRENT MACHINES II LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Direct-Current Machines II Recitation. Associate Professor Kloeffer.

Special attention is given in this course to the different methods of determining generator and motor efficiencies and to the proper tabulation and interpretation of results. The latter part of the course is devoted to the calibration of electrical instruments. Text: Swenson and Frankenfield's *Testing of Electromagnetic Machinery*, Vol. 1.

121. ELECTRICAL MEASUREMENTS RECITATION. Junior year, first semester. Lectures and recitations, one hour. One semester credit. Prerequisites: Calculus I (Math. 113) and Engineering Physics II (Physics 212). Associate Professor Kloeffer.

This course is an extension of the work in electricity in Engineering Physics II. It treats of the various methods for the measurement of resistance, current, electromotive force, capacity, and inductance. Text: A. W. Smith's *Principles of Electrical Measurements*.

126. ELECTRICAL MEASUREMENTS LABORATORY. Junior year, first semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Electrical Measurements Recitation. Associate Professor Kloeffer.

The laboratory course follows the work of the classroom by giving applications of the fundamental principles studied.

130. ELECTRICAL ENGINEERING M-I RECITATION. Senior year, first semester. Lectures or recitations, three hours. Three semester credits. Prerequisites: Engineering Physics II (Physics 212) and Calculus I (Math. 113). Assistant Professor Brenneman.

This course covers the subject of direct-current machines with reference to the fundamental laws of the electric circuit, the principles of direct-current machinery, and the more important commercial tests. Text: Bailey's *Dynamo-Electric Machinery*.

135. ELECTRICAL ENGINEERING M-I LABORATORY. Senior year, first semester. Laboratory, three hours. One semester credit. This course should accompany or follow Electrical Engineering M-I Recitation. Mr. Beckwith.

Practice is given in the proper use of electrical measuring instruments. The experiments include a variety of tests requiring accurate observation, and a knowledge of the theory of dynamo machines. The various standard characteristics and efficiency tests are given. A written report on each test is required.

140. ELECTRICAL ENGINEERING M-II RECITATION. Senior year, second semester. Lectures and recitations, three hours. Three semester credits. Prerequisite: Electrical Engineering M-I. Professor Reid.

The work covers briefly the important principles of alternating-current phenomena. The leading types of alternating-current machinery and apparatus are discussed with reference to their operation and their adaptability to different classes of service. Text: Bailey's *Dynamo-Electric Machinery*.

145. ELECTRICAL ENGINEERING M-II LABORATORY. Senior year, second semester. Laboratory work, three hours. One semester credit. Mr. Beckwith.

This course includes practice in the use of alternating-current instruments; standard tests of alternators, motors, and transformers; and methods of operating the different types of alternating-current machinery.

150. ELECTRICAL MACHINE DESIGN I. Senior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Direct-Current Machines II. Associate Professor Kloeffer.

The purpose of the course is to acquaint the student with the principles of commercial design of direct-current machinery. Each student is required to make the necessary calculations and drawings for a direct-current generator. Text: Gray's *Electrical Machine Design*.

155. ELECTRICAL MACHINE DESIGN II. Senior year, second semester. Laboratory, six hours. Two semester credits. Prerequisites: Alternating-Current Machines II and Electrical Machine Design I. Associate Professor Kloeffer.

This is a continuation of Electrical Machine Design I. Drawings are made from the direct-current generator previously calculated. A study is made of the principles of alternating-current design as applied to transformers, and each student makes the necessary design calculations for a transformer.

160. ELECTRICAL ENGINEERING C RECITATION. Senior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisite: College Physics. Mr. Beckwith.

This work is designed to cover briefly the fundamental principles of direct-current and alternating-current electricity. Emphasis is laid upon the proper installation and operation of the different classes of machines and the use of electricity for lighting and power. Text: Bailey's *Dynamo Electric Machinery*.

165. ELECTRICAL ENGINEERING C LABORATORY. Senior year, second semester. Laboratory work, three hours. One semester credit. Mr. Beckwith.

The laboratory practice is designed to give the student a knowledge of the most important commercial tests. The proper use of electrical instruments is emphasized. A written report of each laboratory test is required.

170. ELECTRICAL MACHINERY AND CONSTRUCTION. Freshman year, first and second semesters. Laboratory work, six hours. Two semester credits. Professor Reid, Assistant Professor Brenneman, and Mr. Beckwith.

This is an introductory course in applied electricity. About one-half the time is devoted to acquainting the student with the various modern methods of interior wiring, approved by the National Board of Fire Underwriters, including open, cleat wiring, knob and tube-concealed wiring, flexible and rigid iron-pipe conduit, and metal molding. The wiring "code" is used as a reference in this part of the course, and on its completion the student should be competent to plan, lay out and install the wiring for the usual residence or business building.

The remainder of the time is devoted to the installation, care, operation, and repair of electrical machinery. It includes armature winding of direct- and alternating-current motors and generators; the diagnosis and location of faults—short circuits, open circuits, grounds—and the repair of these various types of electrical-machine troubles. It also includes the installation and connection of motors, generators, meters, compensators, and other of the usual types of electrical apparatus.

195. THESIS. Senior year, continuing through both semesters. First semester: three hours; one semester credit. Second semester: six hours; two semester credits. Professor Reid, Associate Professor Kloeffer, Assistant Professor Brenneman, and Mr. Beckwith.

The subject for thesis work is selected in consultation with the head of the department, at the beginning of the first semester of the senior year. The work is continued during the second semester. Every opportunity is given the student to work out original ideas as to design and operation of electrical apparatus and machinery.

FOR GRADUATES AND UNDERGRADUATES

201. ALTERNATING-CURRENT MACHINES I RECITATION. Junior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisites: Calculus II (Math. 116) and Direct-Current Machines I. Professor Reid.

The work consists of a mathematical treatment of alternating-current phenomena. A study is made of the vector method of treating alternating-current problems. The solution of problems involving single and polyphase circuits forms an important part of the course. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. II.

205. ALTERNATING-CURRENT MACHINES I LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Alternating-Current Machines I Recitation. Professor Reid and Associate Professor Kloeffer.

It is the aim of this course to provide a series of experiments illustrating the theoretical work of the lecture room. Practice is given in the accurate measurement of capacity and inductance, and the effect of each upon the circuit. The latter part of the course is devoted to a study of polyphase circuits.

210. ALTERNATING-CURRENT MACHINES II RECITATION. Senior year, first semester. Recitations or lectures, four hours. Four semester credits. Prerequisite: Alternating-Current Machines I. Professor Reid.

This is a continuation of Alternating-Current Machines I. The course consists of a study of the theory of alternating-current machinery, alternators, synchronous motors, induction motors, transformers, and the various devices used in connection with alternating-current work. A study is also made of the application of the different types of machinery to industrial uses. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. II.

215. ALTERNATING-CURRENT MACHINES II LABORATORY. Senior year, first semester. Laboratory work, six hours. Two semester credits. This course should accompany or follow Alternating-Current Machines II Recitation. Professor Reid and Mr. Beckwith.

A series of experiments involving special and commercial tests of alternators, synchronous motors, transformers, and the different types of alternating-current machinery and apparatus, are carried out.

220. TELEPHONY RECITATION. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisites: Direct-Current Machines I, and Alternating-Current Machines II. Associate Professor Kloeffer.

This course covers the principles of telephonic communication. A careful study is made of telephone apparatus and circuits used on magnets, common battery (manual) and automatic systems. Some time is devoted to the general problem of testing, maintenance, construction, and operation of telephone systems.

225. TELEPHONY LABORATORY. Senior year, first semester. Laboratory, three hours. One semester credit. This course should accompany or follow Telephony Recitation. Associate Professor Kloeffer.

This course includes the study and measurement of telephone parts, the actual wiring of telephone circuits on the magneto, common battery and automatic systems, location of line trouble, and transmission efficiency tests on various types of apparatus and circuits.

235, 236. ILLUMINATING ENGINEERING. Senior year, second semester. Lectures and recitation, two hours; laboratory, three hours. Three semester credits. Prerequisites: Calculus II (Math. 116) and Engineering Physics II (Physics 212). Associate Professor Kloeffer.

This course is devoted to a study of photometry light standards, the principles of illumination, and illumination design. Each student is required to design the illumination of some shop, residence, or public building. Texts: Croft's *Practical Electric Illumination*, and bulletins of the National Lamp Works.

240. ELECTRIC RAILWAYS. Senior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisite: Alternating-Current Machines II. Professor Reid.

A study is made of the development of electric traction; traffic conditions and train schedules; speed-time curves; power generation and distribution for electric railways signal systems; types of cars and locomotives in use; various control systems; and adaptability of electric traction to steam road. Text: Harding's *Electric Railway Engineering*.

Farm Engineering

Professor _____
Associate Professor SANDERS

Instructor DRIFTMIER
Assistant SMITH

This department gives instruction in such branches of engineering as are directly related to agriculture. It also correlates and gives general supervision to such courses presented in other engineering departments as are open to students in agriculture and agricultural engineering, in order that the agricultural application and uses of engineering principles, methods, and materials may be kept clearly before the student.

In all the courses given, the time is carefully apportioned between the classroom and the laboratory, in order to present the subject in the clearest and most forceful way. The practical application of theoretical principles is emphasized.

The various courses in rural architecture, farm machinery, and tractors are under the direct supervision of this department. The student is taught the requirements of farm buildings, is trained to plan their arrangement and to select and use the proper construction materials in the most advantageous way. The farm machinery laboratory equipment is unusually ample and complete; all kinds of the most modern implements, to the value of nearly \$18,000, are available, whereby their construction, adjustment, operation, and care may be fully covered, not only in laboratory study, but in field work and draft tests as well. The study of traction engines is arranged to cover thoroughly the construction, operation and repair of the numerous modern tractors which are part of the regular equipment; traction tests in conjunction with various types of farm power machinery are also made. The tractor laboratory is also equipped with four tractor power units mounted on bases, with various types of tractor ignition apparatus, and with complete apparatus for power and draft tests. All farm machinery and tractor equipment is kept up to date through a system of exchange with the manufacturers whereby old machines are replaced, when advisable, by new ones.

The comparatively recent development of this work, and its rapidly growing importance, renders investigational study very valuable, and special attention is given to the courses covering this phase of the subject.

COURSES IN FARM ENGINEERING**FOR UNDERGRADUATES**

102. **RURAL ARCHITECTURE.** Elective, both semesters. Lectures, recitations, drafting-room practice, nine hours. Three semester credits. Mr. Driftmier.

This course includes lectures on the requirements, details of arrangement, and materials of construction for barns, storage, and work buildings for the farm. The preparation of specifications, bills of material, and estimates of costs is an essential part of the course. In the drafting-room, plans are prepared for typical farm buildings.

106. **FIELD MACHINERY RECITATION.** Sophomore year and elective, both semesters. Class work, one hour. One semester credit. Mr. Driftmier.

The fundamentally important definitions and principles relating to farm machinery are first given, this being followed by material concerning the development, construction, operation, and use of soil preparation, seeding, cultivating, harvesting, and miscellaneous machinery. The importance of proper selection and care of farm machinery is emphasized.

107. **FIELD MACHINERY LABORATORY.** Sophomore year and elective, both semesters. Laboratory, three hours. One semester credit. Mr. Driftmier.

A detailed study of the machines taken up in the classroom is conducted both in the laboratory and in the field.

111. **POWER MACHINERY RECITATION.** Junior year and elective, second semester. Class work, one hour. One semester credit. Prerequisite: Field Machinery. Mr. Driftmier.

This course continues the study of field machinery with special reference to those machines requiring mechanical power for their operation, including engine plows, hay balers, feed mills, corn shellers, ensilage cutters, and threshing machines.

112. **POWER MACHINERY LABORATORY.** Junior year and elective, second semester. Laboratory, three hours. One semester credit. Associate Professor Sanders and Mr. Driftmier.

Laboratory and field instruction is given and tests are conducted upon the machines discussed in the classroom.

116. **TRACTORS AND TRUCKS RECITATION.** Senior-year, first semester. Lectures and recitations, two hours. Two semester credits. Prerequisite: Farm Motors. Associate Professor Sanders.

This course covers the study of the construction and operation of tractors and trucks, with special reference to machines using internal combustion engines as power units.

117. **TRACTORS AND TRUCKS LABORATORY.** Senior year, first semester. Laboratory, three hours. One semester credit. Associate Professor Sanders and assistants.

A study is made of the construction of steam and gas tractors and trucks and practice is given in the operation and testing of these machines under belt, road, and field conditions.

119. **FARM SANITATION AND WATER SUPPLY.** Elective, second semester. Class work, two hours. Two semester credits. No prerequisite. Mr. Driftmier.

Sources of water supply, installation of cisterns on the farm, and farm sanitation are studied. No text is used, the instruction being given by lectures, bulletins, and library references.

120. FARM EQUIPMENT RECITATION. Elective, both semesters. Lectures and recitations, one hour. One semester credit. Mr. Driftmier.

A study of handy farm practices and important items of equipment for the farmstead is made in this course.

121. FARM EQUIPMENT LABORATORY. Elective, both semesters. Laboratory, three hours. One semester credit. Mr. Driftmier.

Practice is given in rope work, including knots, splices and halters; belt lacing and splicing; soldering; pipe fitting; and repairing of farm machinery.

125. FARM MOTORS RECITATION. Junior year, both semesters and summer school. Lectures and recitations, two hours. Two semester credits. Associate Professor Sanders.

This course involves a descriptive study of steam engines, boilers, internal-combustion engines and automobiles, with special reference to their utilization on the farm.

126. FARM MOTORS LABORATORY. Junior year, both semesters and summer school. Laboratory, three hours. One semester credit. Associate Professor Sanders and assistants.

In the laboratory, tests are conducted upon the machines discussed in the classroom.

130. ADVANCED FARM MACHINERY. Senior year and elective, both semesters. Laboratory, six hours. Two semester credits. Prerequisites: Field Machinery and Power Machinery. Associate Professor Sanders and Mr. Driftmier.

Draft tests are made on various types of farm machines. A study is made also of the cost of operating these machines.

135. ADVANCED TRACTORS AND TRUCKS. Elective, both semesters. Laboratory, six hours. Two semester credits. Prerequisite: Tractors and Trucks. Associate Professor Sanders.

Draft, power, and fuel economy tests are made upon standard types of tractors and trucks.

175. THESIS. Senior year, continuing through both semesters. First semester: laboratory, three hours: one semester credit. Second semester: laboratory, six hours; two semester credits. Associate Professor Sanders and Mr. Driftmier.

Original problems relating to subjects taught in this department are assigned for investigation, after consultation with the head of the department, at the beginning of the first semester of the senior year.

FOR GRADUATES AND UNDERGRADUATES

205. FARM MACHINERY RESEARCH. Elective, both semesters. Six to fifteen hours laboratory or reading. Two to five semester credits. Assignment by permission. Prerequisites: Field Machinery and Power Machinery and such other preparation as may be necessary to conduct properly the investigation assigned. Associate Professor Sanders and Mr. Driftmier.

Farm Machinery offers a broad field for original investigation along the lines of draft requirements, power consumption, and cost of operating. Students admitted to this course are assigned to one project.

215. TRACTOR RESEARCH. Elective, both semesters. Six to fifteen hours laboratory, computation, or reading. Two to five semester credits. Prerequisites: Tractors and Trucks, and such other preparation as may be necessary to conduct properly the problem assigned. Associate Professor Sanders.

Intensive studies are made of problems relating to tractor operation and construction.

General Engineering

Dean SEATON

101. **ENGINEERING LECTURES.** Freshman year, continuing through both semesters. Lectures, one hour a week. Dean Seaton, other members of the engineering faculty, and visiting practicing engineers.

These lectures are designed to acquaint students who are beginning the study of engineering and architecture with the fundamental principles of their profession and to give them a general survey of the field of engineering.

105. **SEMINAR.** Sophomore, junior, and senior years. Required throughout each year. Lectures, papers, and discussions, one hour a week. Members of the engineering faculty.

This work differs for the various curricula, and as far as possible is conducted by the student branches of the professional engineering societies. In the case of electrical engineering students the work is conducted by the student branch of the American Institute of Electrical Engineers; the student branch of the American Society of Mechanical Engineers has charge of the work for students in mechanical and flour-mill engineering; the Kansas State Agricultural College Civil Engineering Society and the Architects' Club conduct the seminars for students in civil engineering and architecture, respectively; the student branch of the American Society of Agricultural Engineers conducts the work for students in agricultural engineering. Students are required to present abstracts and reviews of articles appearing in the journals of their respective societies or in the technical press of their profession or to prepare original articles. Occasionally these individual groups unite in the general Engineering Society, under whose auspices lectures are given by practicing engineers and by members of the engineering and College Faculty on topics of general interest to engineering students.

Shop Practice

Professor CARLSON
Assistant Professor SELLERS
Assistant Professor LYNCH
Assistant Professor JONES
Instructor GRANT
Instructor PARKER
Instructor ARMSTRONG

Instructor BOWHAY
Instructor HANSEN
Instructor STROM
Instructor WINTER
Assistant AIMAN
Assistant GRANELL

The work in the shops is planned to meet the needs of three classes of students: (1) those in the special courses related to engineering and agriculture who expect to make use of the knowledge gained in their subsequent work in the shops and on the farm; (2) those who are training themselves for teaching and need to secure a general knowledge of the principles underlying shop work, and sufficient skill in the performance of various operations, to be able to instruct others; and (3) those in the courses in engineering whose need is to secure a thorough knowledge of the methods of performing various kinds of shop work; of the machines best suited for the different purposes; of the amount of work that may be expected of the different machines and of the workmen under different conditions.

The equipment of the shops is set forth to a certain extent below:

WOOD SHOP. This room is 40 by 90 feet; it contains 252 separate sets of tools, and benches for forty-eight students in each class. In this room are also installed an automatic band-saw filer and setter, and two grindstones driven by an individual motor.

PATTERN SHOP. This room is 45 by 81 feet and contains sixteen K. S. A. C. 12-in. by 32-in. safety wood-turning lathes; one 12-inch motor head-stock lathe; one 18-inch pattern-maker's lathe, with tools and chucks; eight patternmakers' benches complete, with necessary small tools, core-box planes, electric glue-heating fixture, and other tools and apparatus for pattern work.

WOODWORKING MACHINERY ROOM. This room is 35 by 42 feet, and contains one 24-inch wood planer, one friezer, one 34-inch band saw, one jig saw, one double spindle shaper, one Hoefer drill press, one 20-inch variety saw, one power mortiser, one sandpapering machine, one 8-inch jointer, one foot mortiser; a stock and tool room for holding the material, and small tools and gauges used in the wood shop.

MACHINE SHOP. This room is 40 by 170 feet, and contains thirteen engine lathes, as follows: One 14-inch Hendy-Norton lathe; two 14-inch Flather lathes; one 13-inch Lodge & Davis lathe; one 16-inch Lodge & Shipley combination engine and turret lathe; two 14-inch Reed lathes; five 14-inch K. S. A. C. lathes; one 28-in. by 20-ft. American lathe, equipped with blocks to raise it to 60-inch swing; one K. S. A. C. speed lathe; one Brown & Sharp No. 3-A universal milling machine; one Brown & Sharp No. 2 universal milling machine; one No. 2 Brown & Sharp universal grinder; one K. S. A. C. (Hendy-Norton pattern) shaper; one K. S. A. C. (Pratt & Whitney pattern) shaper; one Gray 26-in. by 6-ft. planer; one Niles 51-inch vertical turning and boring mill; one Baker Bros. Key seater; one Barnes 34-inch self-feed drill press; one Rogers 12-inch sensitive drill press; two K. S. A. C. 12-inch sensitive drill presses; one K. S. A. C. (Bemis-Miles pattern) 20-inch double-traverse quick-return shaper; two Morse & Dexter valve reseating machines; one Walker universal grinder; one K. S. A. C. special drill grinder; one bolt and pipe machine, taking pipe up to two inches; one power hack saw; one Emerson direct-connected motor-polishing machine; one 18-inch Whitcomb-Blaisdell lathe; one 19-inch LeBlond lathe; one Greenlee turret lathe; one 24-inch Ryerson lathe; one floor grinder; one Baker No. 216 drill; one P. & W. No. 10 miller; one P. & W. No. 2 screw machine; one Warner & Swasey No. 6 screw machine; one Acme turret lathe; one electric bench grinder; one B. & S. screw machine; one Grant riveter No. 80B; one Warner & Swasey No. 2 screw machine; one B. & S. grinder No. 0; one Hendey No. 4 miller; one Townsend disc grinder; two Allen three-spindle drill presses; one Hendey lathe 14 in. by 5 ft.; one Fox No. 3½ miller; one Whitcomb-Blaisdell planer; one Whitney No. 6 hand miller; one LaPointe No. 1 broaching machine; one Allen drill press, four spindle; one W. & M. grinder; one diamond polisher No. 7; one H. & W. No. 0 high-speed drill; one Cleveland automatic; one Norton grinder 10 in. by 36 in.; one Blount 14-inch wet grinder; one B. & S. No. 3 cutter grinder; two National engine lathes, 18 in. by 6 ft.; a complete set of

sheet-metal worker's tools; benches and tools for fifty students, and a tool room completely stocked with the necessary tools. A time clock (calculus-graph) is installed near the machine shop office for recording the attendance of the students and workmen.

Adjacent to the machine shop is a room 18 by 20 feet, which is used as a stock and storage room for the rough and finished parts of the 1½-hp. gas engine and 12-in. by 32-in. wood-turning lathes, which are constantly in the process of construction as problem work for the students.

BLACKSMITH SHOP. This room is 50 by 100 feet and is equipped with twelve K. S. A. C. downdraft forges and thirty-three Sturtevant downdraft forges for students' use, and two large special Sturtevant forges for general use. Each forge has an anvil and a complete set of forging tools, and is supplied with forced draft and power exhaust. In addition to the general tools for a fully equipped blacksmith shop there is also installed a 12-inch K. S. A. C. sensitive drill press, punch, and shear, K. S. A. C. (Erie pattern) 400-pound steam hammer, emery grinder, one Higley cold saw, one single spindle Allen drill press, tire bender, tire shrinker, two Oxyweld oxyacetylene welding outfits, and a number of pieces of special apparatus built by the department.

IRON FOUNDRY. This room is 27 by 100 feet. It is equipped with a 1½-ton Colliau Cupola; 4-ton, 25-foot-span K. S. A. C. traveling crane; core oven, 5 by 6 by 7 feet (arranged so it can be heated with either coke or gas); one 2-ft. by 3-ft. K. S. A. C. rumbler; one K. S. A. C. emery grinder; one K. S. A. C. molding machine; one Arcade squeezer-type molding machine; one air-driven sand riddler; one C. H. Besly wet tool grinder, 14 in. by 16 in.; one floor grinder; one molding machine; one hammer core machine; an exceptionally large number of flasks, both wood and iron; ladles and necessary small tools.

BRASS FOUNDRY. This room is 24 by 34 feet. It is equipped with one 21-in. by 36-in. brass furnace, one 11-in. by 20-in. brass furnace, crucibles, flasks, molding tubes, benches, cases, racks and necessary tools for bench and floor molding.

AMPHITHEATER This room is 24 by 54 feet. It is adjacent to the blacksmith shop and iron and brass foundries, and is equipped with forge, anvil, forge tools, bench, molding trough and molding tools, blackboard, etc., for lectures and demonstration work.

LOCKER. This room is 36 by 40 feet. It is conveniently located and is equipped with 244 special metal lockers for the use of students taking work in the machine shop, blacksmith shop, foundry and engineering laboratory. A portion of this is made a separate locker room and bathroom for the use of the shop foreman, and contains seven metal lockers.

COURSES IN SHOP PRACTICE

FOR UNDERGRADUATES

101. **WOODWORK.** Freshman year, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Parker and Mr. Aiman.

This is a course for engineering students, the first part of which consists of exercises to give familiarity with hand and bench tools. The lat-

ter part of the course is devoted to such work as will acquaint the student with the methods of operating the various woodworking machines used in commercial woodworking.

105. **WOODWORK I.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Parker and Mr. Aiman.

This beginning course is designed to give practice with the woodworking bench tools on the various common woods, and to teach the proper methods of finishing woods with stains, varnish, paint, etc. Considerable emphasis is placed upon the proper use and care of tools.

110. **WOODWORK II.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Woodwork I (Shop 105). Mr. Parker and Mr. Aiman.

This is a continuation of Woodwork I, with practice in the use of the rabbet, router, and matching planes, and with the plow dado and fillister on such work as will give the necessary practice. Considerable emphasis is laid upon the proper use and care of the tools and on the use of wood finishes.

115. **WOODWORK III.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Woodwork II (Shop 110). Mr. Parker and Mr. Aiman.

In this course in mill work, practice is given on such articles as bring into use all of the woodworking machinery.

120. **WOODWORKING FOR GRAMMAR GRADES.** Elective, both semesters and summer school. Laboratory, six hours. Two semester credit. Prerequisite: None. Mr. Parker and Mr. Aiman.

This course is designed for those who are preparing to teach manual training. It takes up the beginning work, and the exercises given are such as would be suitable for the grammar grades.

125. **WOODWORKING I FOR HIGH SCHOOLS.** Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodworking for Grammar Grades (Shop 120). Mr. Parker and Mr. Aiman.

In this continuation of Woodworking for Grammar Grades, problems suitable for students in the high schools are given. Special attention is given to the study of woods and methods of finishing them, as well as to the use and care of tools.

130. **WOODWORKING II FOR HIGH SCHOOLS** Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodworking I for High Schools (Shop 125). Mr. Parker and Mr. Aiman.

This is a continuation of Woodworking I for High Schools, with advanced work in cabinet construction by the use of woodworking machinery, and such bench work as necessary. Special emphasis is placed upon the quantity as well as the quality of the work, in order that a proper use may be made of time. Assignments are given which cover wood-working machinery, tools, and sharpening, and the drawing up of sketches for a completely equipped woodworking shop.

135. **WOODTURNING.** Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodworking II for High Schools (Shop 130). Mr. Parker.

This work is such as will give the student a thorough training in handling a lathe and turning tools. Those taking this work are expected to arrange their assignments so that a portion of the time can be devoted to assisting with the teaching of the more elementary classes in the wood shop. This training will be found valuable to those who have had no teaching experience.

140. **ADVANCED WOODWORK.** Elective, first semester. Laboratory, six hours, supplemented by lectures. Two semester credits. Prerequisite: Woodwork (Shop 101). Mr. Parker and Mr. Aiman.

Bench and machine work in making some of the most common building details, such as porch newels and rails, and plain and fancy molding cornices, is given. The lecture work consists of a detailed study of the wood finishes, tools, and machines used in building construction.

141. **FARM SHOP PRACTICE.** Elective, both semesters and summer school. Laboratory, nine hours. Three semester credits. Assistant Professors Jones and Lynch.

This course is designed for those who wish to prepare themselves for teaching in accordance with the Smith-Hughes act. The course consists of blacksmithing closely related to farm work, babbitting, soldering, gluing belts, belt lacing, thread cutting with hand dies and taps, drilling, drill grinding, and brazing.

145. **PATTERN MAKING.** Junior and senior years, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Foundry Practice (Shop 160). Mr. Parker and Mr. Aiman.

A series of exercises is given embodying the principles governing the construction of plain and split patterns, including core prints and core boxes, after which practical patterns are made of machine parts.

146. **FARM WOODWORK.** Elective, both semesters and summer school. Laboratory, nine hours. Three semester credits. Mr. Parker and Mr. Aiman.

This practical course is designed for the training of teachers to handle problems in connection with carpenter work on the farm. It consists of rafter cutting and erection, studding and siding work, making window and door frames, hanging doors, and similar building operations on full-size construction work. Bills of material will be made in all cases before each exercise is started. Exercises are given in saw filing, tool sharpening, and the general care and upkeep of tools.

150. **FORGING I.** Freshman year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite: None. Assistant Professor Lynch and Mr. Granell.

This course in the forging of iron and steel is designed to teach the principles and operations of drawing, bending, upsetting, welding, twisting, splitting, and punching, and the proper methods of making forgings and tools. Tools required: a two-foot rule and a pair of five-inch outside calipers, a center punch, and ball pein hammer weighing with handle about two pounds.

155. **FORGING II.** Sophomore year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite: Forging I (Shop 150). Assistant Professor Lynch and Mr. Granell.

Advanced work in the forging of iron and in the manufacture of steel tools is given, including instruction in hardening, tempering, casehardening, and annealing, heat treating, and testing of tool steels. Tools required: Same as in Forging I.

160. **FOUNDRY PRACTICE.** Sophomore year, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Grant.

Practice is given in floor, bench, and machine molding, in core making, and in casting in iron, copper, brass, and special alloys. A study is also made of modern foundry construction, equipment, materials, and methods.

165. **METALLURGY.** Sophomore year, both semesters. Lectures and recitations, two hours. Two semester credits. Prerequisites: Foundry Practice (Shop 160), Chemistry E-I (Chem. 107). Professor Carlson and Assistant Professor Sellers.

This course deals with the manufacture and use of iron, steel, copper, and their alloys, as well as their proper selection and use in the manufacturing industries.

170. MACHINE TOOL WORK I. Junior year, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Foundry Practice (Shop 160). Assistant Professors Sellers and Jones, and Mr. Bowhay.

Practice is given in chipping, filing, shaper and planer work, scraping, drilling, and turning on the lathe. Tools required: A four-inch scale, or B. & S. slide caliper, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, and one B. & S. center gauge.

180. ADVANCED PATTERN MAKING. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Pattern Making (Shop 145). Professor Carlson and Mr. Parker.

This is a continuation of Pattern Making, with more advanced work, including match-board work, patterns for molding machines, and general pattern work.

183. ADVANCED FOUNDRY PRACTICE. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Foundry Practice (Shop 160.) Professor Carlson and Mr. Grant.

This is a continuation of Foundry Practice, including green and dry sand and loam molding. A study is also made of the different mixtures of iron, of handling the cupola and brass furnace, of difficult molding and core work, and of making steel castings.

186. FORGING III. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Forging II (Shop 155). Assistant Professor Lynch and Mr. Grannell.

More advanced work is given in the working of iron and steel and in studying the effect of the different heat treatments upon steel. Opportunity will be given for work with the oxyacetylene and thermit processes of welding.

189. FORGING IV. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Forging III (Shop 215). Professor Carlson and Assistant Professor Lynch.

Opportunity is offered for work in steel and iron, oxyacetylene welding, steam hammer work, drop forge work, and other lines, depending upon the object in view and the previous training of the student.

192. MACHINE TOOL WORK II. Junior year, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Machine Tool Work I (Shop 170). Assistant Professors Sellers and Jones and Mr. Bowhay.

Progressive problems are given in turning and calipering, in boring, in reaming and taper turning and in threading on the lathe with exercises in chucking, the use of forming tools, and gear cutting. A study is made of cutting edges and tool adjustments best suited to the different metals, and of cutting speeds and feeds. Tools required: same as for Machine Tool Work I.

193. MACHINE TOOL WORK III. Senior year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite: Machine Tool Work II (Shop 225). Assistant Professor Sellers, Assistant Professor Jones, and Mr. Bowhay.

This course takes up work on the turret lathe, boring mill, screw machines, automatic screw machines, and grinder. Practical work is also given with the jigs and templets and a study is made of the rapid production of duplicate parts, of belts, lacings, and other methods of belt connection, and of compound and differential indexing.

195. **THESIS.** Senior year, continuing through both semesters. First semester: laboratory, three hours; one semester credit. Second semester: laboratory, six hours; two semester credits. Professor Carlson and Assistant Professor Sellers.

A thesis gives an opportunity for the student to work out problems of interest and value to himself under his own initiative, but subject to the supervision of the instructors. The shops have ample facilities for carrying on work of this character, of a constructive or investigative nature, and every possible aid is given those who select theses along this line.

196, 197. **AUTOMOTIVE ENGINEERING.** Elective, second semester. Lectures and recitations, one hour; laboratory, three hours. Two semester credits. Prerequisites: Applied Mechanics II, Machine Design I.

This course deals with the construction and operation of the various parts of the automobile, and is especially adapted to the needs of those who expect to follow some phase of automobile work or to take up employment in automobile factories.

FOR GRADUATES AND UNDERGRADUATES

235. **MACHINE TOOL WORK IV.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Machine Tool Work III (Shop 230). Assistant Professors Sellers and Jones.

The time of this course is devoted to the shop phases of efficiency engineering, including time studies and routing of materials. Complete machines and machine parts are constructed from drawings and blue prints. A study is made of the different machine tools from assigned catalogue work, with regard to the economical and efficient production of different classes of products.

240. **MACHINE TOOL WORK V.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Machine Tool Work IV (Shop 235). Assistant Professors Sellers and Jones.

This course is devoted entirely to a systematic study to determine the various time elements that are required in the efficient production of standard machine parts which are being made in the shops.

245, 250. **FACTORY ENGINEERING.** Senior year, first semester. Lectures and recitations, one hour; drafting-room, three hours. Two semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Carlson.

This course deals with the problems of the factory executive, such as the selection, installation, and arrangement of direct and indirect equipment, the standardization of machines and tools, stock and store methods, production orders, routing and dispatching, time study and rate setting, instruction and operation cards, wage systems, cost systems, and the various factors that have to do with the design and control of factories.

255. **FACTORY DESIGN.** Senior year, second semester. Drafting, six hours. Two semester credits. Prerequisite: Factory Engineering (Shop 245, 250). Professor Carlson.

The knowledge gained in the shops and laboratories and in the course in factory engineering is used in the design of a complete factory.

260. **ADVANCED SHOP PRACTICE.** Elective, first semester. Laboratory, nine hours. Three semester credits. Professor Carlson and assistants.

Opportunity is offered those having the necessary preliminary training to specialize to a limited degree along certain lines of Shop Practice, such as the heat treatment of steel, oxyacetylene welding, jig and die work, cutting speeds and feeds, shop management, and systems.

265. **SHOP-PRACTICE RESEARCH.** Elective, both semesters. Laboratory, nine hours. Three semester credits. Professor Carlson and Assistant Professor Sellers.

Those who wish to investigate some phase of shop-practice work in which they are greatly interested are given opportunity to do so. The wonderful improvements in the methods of present-day production amply justify investigative work along this line, and every possible aid will be accorded those wishing to take this work.

Steam and Gas Engineering

Professor CALDERWOOD
Assistant Professor MACK

Instructor BRADLEY
Assistant _____

The object of the instruction in this department is to give to the student the fundamental principles underlying the design, construction, selection, operation and testing of steam boilers; steam engines; and steam turbines; gas producers; gas and petroleum engines; compressed-air and refrigerating machinery; condensers and evaporators. These subjects are developed by courses in engineering thermodynamics and in steam and gas engineering, and are followed in the fourth year by courses in power-plant engineering, in refrigeration, and in heating and ventilation. The classroom instruction of every course consists of lectures and recitations, which are paralleled by work in the drafting-room and laboratory, and supplemented by numerous practical problems, trade catalogues, notes, and inspection trips requiring written reports.

STEAM ENGINEERING LABORATORY

In addition to the equipment installed especially for experimental purposes, all the heating, power, ventilating, and pumping equipment of the College subserves the further purpose of experimental work.

There are available for the boiler tests three 125-horsepower high-pressure fire-tube boilers equipped with under-feed, and side-feed stokers; three high-pressure water-tube boilers, one being equipped with a Roney stoker and the others with under-feed stokers. Besides the high-pressure boilers there are eight low-pressure boilers equipped with under-feed stokers. All of these boilers have full equipment of auxiliaries and are provided with pyrometers, draft gauges, flue-gas samplers, and other instruments for research and laboratory work.

The steam engineering laboratory contains fourteen steam engines with different types of valve gears, including plain slide valves, balanced valves, double valves, piston valves, Corliss valves; also a uniflow engine. These engines range in power from 6 to 250 horsepower. There are also three steam turbines equipped with surface condensers, dry vacuum pumps, wet vacuum pumps, and circulating pumps. A compound reciprocating steam engine is also equipped so that it can be operated condensing or noncondensing. The engines in this laboratory are equipped with electric generators or with absorption brakes.

Three ammonia refrigerating machines are available for laboratory work and a fourth refrigerating machine, which serves the College, is

also used for tests and research in refrigeration. One of the laboratory refrigerating machines serves a thermal-testing room, equipped for low temperature experiments.

The laboratory is also provided with various types of steam pumps, steam traps, steam and ammonia indicators, gauges, injectors, planimeters, pyrometers, and apparatus for testing gauges, indicators, and lubricants.

GAS ENGINEERING LABORATORY

The apparatus for gas engineering instruction and research includes a Smith suction gas producer which supplies gas to a 25-horsepower Foos gas engine. This gas engine is equipped with the necessary cylinder heads and other auxiliaries, so that it can be operated with producer gas, natural gas, water gas, and with light and heavy liquid fuels. Besides the Foos experimental engine, the gas engine laboratory includes many different sizes and makes of gas and oil engines.

A Westinghouse air-pump, a complete compressed-air plant driven by an electric motor, and several fans, are available for experiments with air.

The gas engineering laboratory also includes several types of coal calorimeters, a Junkers and a Sargeant gas calorimeter, apparatus for approximate analysis of fuels, oil-testing equipment, a bearing tester, several different types of pyrometers, a variety of gas-engine indicators, Venturi and Pitot tubes.

COURSES IN STEAM AND GAS ENGINEERING

FOR UNDERGRADUATES

101. STEAM AND GAS ENGINEERING I RECITATION. Junior and senior years, first semester. Lectures and recitations, four hours. Four semester credits. Prerequisites: Kinematics (Ap. Mech. 180) and Calculus II (Math. 116). Mr. Bradley.

This is a study of heat-power engineering, including steam engines, steam boilers, steam turbines, internal-combustion engines, fuels and combustion, gas producers, and valve gears. Texts: *Elements of Steam and Gas Power Engineering*, by Potter and Calderwood; and *Valve Gears*, by Fessenden.

105. STEAM AND GAS ENGINEERING I LABORATORY. Junior and senior years, first semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering I Recitation. Professor Calderwood, Assistant Professor Mack, and Mr. Bradley.

The study and calibration of steam gauges, indicators, and planimeters; valve-setting and steam-engine operations; study of calorimeters, flow meters, and feed-water heaters; determination of the indicated and brake horsepower, mechanical efficiency, and the steam consumption of high-speed automatic cut-off, Corliss, simple and compound engines; tests of DeLaval, Kerr and Terry steam turbines are included in this course. Text: Carpenter and Diederchs' *Experimental Engineering* is used in this and subsequent laboratory courses.

110. STEAM AND GAS ENGINEERING II RECITATION. Junior and senior years, second semester. Lectures and recitations, three hours. Three semester credits. Prerequisite: Steam and Gas Engineering I. Professor Calderwood.

This is a continuation of the study of heat-power engineering, but special stress is put upon the theory of the thermodynamics of gases and

vapors, and gas and vapor cycles. Text: *Elements of Engineering*, by Moyer, Calderwood, and Potter.

115. STEAM AND GAS ENGINEERING II LABORATORY. Junior and senior years, second semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering II Recitation. Professor Calderwood and Assistant Professor Mack.

This course involves the approximate analysis of coal; determination of the calorific values of solid, liquid, and gaseous fuels; evaporative tests of steam boilers; testing of internal-combustion engines, including a study of the various auxiliaries for gas and oil engines; tests of compressed-air and refrigerating machinery.

120. STEAM AND GAS ENGINEERING C RECITATION. Junior and senior years, second semester. Lectures and recitations, two hours. Two semester credits. Prerequisites: Engineering Physics (Physics 212) and Calculus II (Math. 116). Mr. Bradley.

A descriptive study is made of steam boilers, steam engines, steam turbines, gas and oil engines, including the various auxiliaries. Text: Allen and Bursley's *Heat Engines*.

125. STEAM AND GAS ENGINEERING C LABORATORY. Junior and senior years, second semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering C Recitation. Assistant Professor Mack and Mr. Bradley.

The study and calibration of steam gauges, indicators, and planimeters; calorimeters; evaporative tests of steam boilers; determination of the heating value of liquid and gaseous fuels; tests of steam engines; valve setting; tests of steam turbines; tests of internal-combustion engines; operation and testing of refrigerating machines are involved in this course.

130. ELEMENTS OF STEAM AND GAS POWER. Freshman year, both semesters. Lectures, recitations, and laboratory, six hours. Two semester credits. Professor Calderwood, Assistant Professor Mack and Mr. Bradley.

An elementary study is made of steam engines, steam turbines, steam boilers, steam power-plant auxiliaries, gas and oil engines, natural and manufactured gas, gas power-plant auxiliaries, and elements of automotive engineering. Text: Potter and Calderwood's *Elements of Steam and Gas Power Engineering*.

170. DAIRY REFRIGERATION RECITATION. Elective, first semester. Lectures and recitations, one hour. One semester credit. Mr. Bradley.

The elementary theory and principles of operation of various refrigerating and ice-making machinery and of cold storage, with special reference to the dairy industry, are considered.

175. DAIRY REFRIGERATION LABORATORY. Elective, first semester. Laboratory work, three hours. One semester credit. Mr. Bradley.

Various types of refrigeration systems and their operation are studied; steam-engine operation is studied, and refrigeration machines are tested.

195. THESIS. Senior year, continuing through both semesters. First semester: laboratory, three hours; one semester credit. Second semester: laboratory, six hours; two semester credits. Professor Calderwood.

The laboratories of the department are well furnished with apparatus suitable for experimental and research work in the field of heat-power engineering. The subject of the investigation should be selected in consultation with the head of the department at the beginning of the first semester.

FOR GRADUATES AND UNDERGRADUATES

206. POWER-PLANT ENGINEERING. Senior year, first semester. Laboratory, nine hours. Three semester credits. Professor Calderwood, and Assistant Professor Mack.

One-half of the semester is devoted to complete power-plant testing; special investigations of steam-engine performance; operation of gas producers, and advanced laboratory work on internal-combustion engines. The remainder of the time is spent in designing a complete power plant.

210. REFRIGERATION, HEATING, AND VENTILATION RECITATION. Senior year, second semester. Lectures and recitations, two hours. Two semester credits. Prerequisite: Steam and Gas Engineering II. Professor Calderwood.

This course is planned to acquaint the student with the fundamental principles of refrigerating systems, and the application of refrigeration to ice making, cold storage, and the cooling of air, liquids, and solids; also the fundamental principles of heating and ventilation, including the direct and indirect systems, hot-air, hot-water and steam systems of heating. Text: Allen and Walker's *Heating and Ventilation*, and notes on refrigeration.

215. REFRIGERATION, HEATING, AND VENTILATION LABORATORY. Senior year, second semester. Laboratory, three hours. One semester credit. Taken with Refrigeration, Heating and Ventilation Recitation. Professor Calderwood and Assistant Professor Mack.

The laboratory work includes tests of refrigerating machinery and of the thermal conductivity of insulating materials; tests on fans and blowers, radiators and house-heating boilers. The remainder of the time is devoted to the design of heating and ventilating systems for buildings.

220. AERODYNAMICS RECITATION. Elective, senior year, second semester. Lectures and recitations, two hours. Two semester credits. Prerequisite: Steam and Gas Engineering II. Professor Calderwood.

This course is planned to acquaint the student with the fundamental principles of airplane construction and the theory of wind forces. A careful study of aeronautical instruments and current practice in the design of airplanes is included. Text: References to various publications and notes.

225. AERODYNAMICS LABORATORY. Elective, senior year, second semester. Laboratory, three hours. One semester credit. Taken with Aeronautics Recitation. Professor Calderwood and Assistant Professor Mack.

The laboratory work includes tests of various types and forms of airplane wing models, efficiency tests of propellers, and investigation of theory advanced in Aërodynamics Recitation.

FOR GRADUATES

301. ADVANCED THERMODYNAMICS. Elective, first or second semester. Lectures and recitations, two hours. Two semester credits. Professor Calderwood.

A study is made of the advanced phases of engineering thermodynamics, including research work along fundamental properties of gases and vapors. Reports are made of recent investigations along thermodynamic lines.

305. ENGINEERING RESEARCH. Elective, first or second semester. One semester credit for each three hours of laboratory work. Professor Calderwood and Assistant Professor Mack.

The laboratory work is correlated with the work of the Engineering Experiment Station. Investigations on lubricants, fuels, combustion, internal-combustion engines, steam engines, steam turbines, steam boilers, gas producers, refrigeration, heat insulating materials, heating and ventilation, compressed air and similar subjects are carried on.

Data secured in this course may be used as the basis for a master's thesis.

Engineering in the Summer School

In order to encourage the introduction of manual training and industrial drawing in the common schools and high schools of the state, and to improve the quality of work now being given, the College offers summer courses in mechanical drawing, manual training, and shop practice for high-school and grade teachers.

In addition various courses required in the several engineering curricula are offered in the Summer School. This enables teachers who wish to take an engineering curriculum to get a considerable start on the work during their summer vacations, and also enables College students who are irregular to make up their back courses.

For full information in regard to the courses offered, see the section of this catalogue devoted to the Summer School. A special circular giving details concerning the Summer School may be had upon application to the Vice President of the College.

Special Courses Related to Engineering

Special short courses dealing with automobile repair, tractor operation, carpentry, machine-shop work, foundry practice, blacksmithing, and electrical repair work are grouped with other special courses in another part of this catalogue, and are there described in detail. Reference should be made to the general index in the back of this book. A special circular describing this work may be had on application to the Vice President of the College.

Division of Home Economics

HELEN BISHOP THOMPSON, *Dean*

Modern research in the sciences and present-day development of the industries, arts, and professions have brought a recognition of the value of technical training as a part of the preparation for life's work. An educational plan which combines industrial, technical, and scientific subjects with the older general studies results to the student in the power to express, in everyday activities, the knowledge acquired in the classroom. It increases the capacity for productive work and develops the desire to realize in practical form the theories and principles studied. The aim of a collegiate course in home economics is not merely to increase the student's stock of information, but to stimulate interest in continued study or research, to train in accuracy in detail, to teach discrimination with regard to criteria by which to interpret results of work, and to cultivate an attitude of economic and social responsibility.

The course as outlined below is arranged to meet the needs of the following groups of students; those who wish to teach, those who wish to enter graduate courses leading to technical or professional work, and those who wish to apply their knowledge to various problems of home life or in fields of industry and social service in which an understanding of home-economics subjects is essential to intelligent action. While emphasis is laid on the material and practical side of life, the training does not stop here. The young women are constantly reminded that life is not drudgery; that technical knowledge and scientific skill even fail to include the full meaning of education in its highest sense. They are taught that any training that fails to develop harmoniously body, mind, and spirit is inadequate and incomplete. They are brought face to face with ideals as well as with actualities, and are made to see that, while skillful labor gives dignity to life, grace, refinement, and self-poise are the highest requisites for true service.

The training given is as varied as it is broad. It includes a knowledge of the laws of health, an understanding of the sanitary requirements of the home; the study of values, both absolute and relative, of the various articles used in the home; the wise expenditure of money, time, and energy; the scientific principles underlying the selection and preparation of food; the right care of children; and the ability to secure efficient service from others. Instruction is methodical and thorough, and is suited to the circumstances of the students. Experience shows that such training teaches contentment, industry, order, and cleanliness, and fosters a woman's independence and feeling of responsibility.

The work in home economics includes:

A four-year curriculum, leading to the degree of Bachelor of Science.

A five-year curriculum leading to the degree of Bachelor of Science and a diploma in nursing.

A three-year curriculum in the School of Agriculture.

A one-year curriculum in lunch-room management, for which a certificate is granted.

A housekeepers' course, about fifteen weeks in length, for which a certificate of proficiency is granted.

CURRICULUM IN HOME ECONOMICS

The training in the four-year curriculum is both general and specific. Since scientific training is fundamental in the intelligent and successful administration of the home, strong courses in the sciences are given as a foundation for the special training in home economics. To the end that well-rounded culture may be attained, courses in English, history, economics, sociology, and psychology receive due prominence. The time of the student is about equally divided among the purely technical subjects, the fundamental sciences, and studies of general interest. The courses in the related subjects are given in the different departments of the College, while the technical courses are given by the home economics departments. In the junior and senior years opportunity is given for choice of electives, which makes it possible for students to specialize in some chosen line. To this end electives are to be chosen in groups combined logically in courses approved by the Faculty or by the student's dean.

The four-year curriculum is recommended for all who desire to teach home economics, or to enter any professional field in which home economics may be applied.

The five-year curriculum, offered in affiliation with the Charlotte Swift Hospital of Manhattan, enables the student wishing to take the Bachelor of Science degree and the full professional training in nursing to complete this work in five years. The first two years are spent at the College. A modified home economics curriculum is followed, including the sciences upon which nursing is based and omitting the subjects marked with an asterisk. The third and fourth years are spent at the Nursing School of the hospital, where both theoretical and practical training in nursing is given. During the fifth year required courses for the Bachelor of Science degree are completed at the College and electives are chosen which will prepare the student for the field of nursing in which she is most interested.

The demand for trained women to fill administrative and teaching positions in schools of nursing and to enter the various branches of public-health nursing is greater than the supply and offers a growing and attractive field of work for the college graduate.

Before entering upon this curriculum the student must have her plan of study approved by the dean of the Division of Home Economics.

Further information concerning the work at the hospital may be obtained from the director of the Training School for Nurses of the Charlotte Swift Hospital, Manhattan.

The College does not assume the responsibility of insuring employment to graduates, but the latter rarely experience difficulty in obtaining remunerative positions.

Curriculum in Home Economics

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | SECOND SEMESTER |
|----------------------------------|-----------------------------------|
| College Rhetoric I | College Rhetoric II |
| Engl. 101 3(3-0) | Engl. 104 3(3-0) |
| Chemistry I | Chemistry II |
| Chem. 101 5(3-6) | Chem. 102 5(3-6) |
| Design or Design A* | Household Physics |
| Ap. Art 101 or 106..... 3(1-6) | Physics 101 4(3-3) |
| Foods I* | Clothing I* |
| Food and Nut. 101..... 3(1-6) or | Clo. and Text. 101..... 2(1-3) or |
| Elem. Hygiene and Home | House Furnishings§* |
| Nursing§ | Ap. Art 108 2(1-3) |
| Hshld. Econ. 103 3(3-0) | Costume Design I* |
| Library Methods | Clo. and Text. 106..... 2(0-6) |
| Lib. Ec. 101 1(1-0) | Physical Education W-II |
| Current History | Phys. Ed. 152A 1(0-3) |
| Hist. 126 1(1-0) | |
| Physical Education W-I | |
| Phys. Ed. 151A..... 1(0-3) | |

SOPHOMORE

| FIRST SEMESTER | SECOND SEMESTER |
|--------------------------------|-------------------------------|
| Organic Chemistry HE | Foods II |
| Chem. 121 5(3-6) | Food and Nut. 106..... 5(3-6) |
| English Literature HE-I | English Literature HE-II |
| Engl. 177 3(3-0) | Engl. 180 3(3-0) |
| General Zoölogy | Embryology and Physiology |
| Zoöl. 105 5(3-6) | Zoöl. 108 5(3-6) |
| Clothing II* | Gardening* |
| Clo. and Text. III..... 3(1-6) | Hort. 122 3(3-0) |
| Physical Education W-III | Physical Education W-IV |
| Phys. Ed. 153 1(0-3) | Phys. Ed. 154 1(0-3) |

JUNIOR

| FIRST SEMESTER | SECOND SEMESTER |
|--------------------------------|--------------------------------|
| German I† | German II† |
| Mod. Lang. 101 3(3-0) or | Mod. Lang. 102 3(3-0) or |
| French I† | French II† |
| Mod. Lang. 151 3(3-0) | Mod. Lang. 152 3(3-0) |
| Human Nutrition | Household Management* |
| Food and Nut. 112..... 3(3-0) | Hshld. Econ. 106 2(2-0) |
| Household Microbiology* | Textiles* |
| Bact. 121 5(3-6) | Clo. and Text. 116..... 3(2-3) |
| Economics | Psychology C |
| Econ. 101 3(3-0) | Educ. 103 3(3-0) |
| Elective 3(-) | Elective 6(-) |

§ The substitution of these courses for the courses in Foods I and Clothing I must first have the approval of the Dean of the Division.

† Students who have offered French or German for entrance should take advanced courses in modern language, the courses which they take depending upon their preparation. Students who under these circumstances take less than nine semester credits in modern language are required to take additional elective hours, so that their total requirement is the same as for other students.

SENIOR

FIRST SEMESTER

| | |
|------------------------|-----------|
| German Readings | |
| Mod. Lang. 111..... | 3(3-0) or |
| French Readings | |
| Mod. Lang. 161 | 3(3-0) |
| American History | |
| Hist. 101 | 3(3-0) |
| Dietetics | |
| Food and Nut. 201..... | 5(3-6) |
| Elective | 6(-) |

SECOND SEMESTER

| | |
|------------------------------|---------|
| American Government | |
| Hist. 151 | 3(3-0) |
| Sanitation and Public Health | |
| Hshld. Econ. 211 | 3(3-0) |
| Elective | 11(-) |

Groups of Electives for Students in the Division of Home Economics

The groups given below are selected with a view to training students for the vocations in which home economics may be directly applied.

A sufficient number of hours may be chosen from any group to fill the elective requirement, or a smaller number of hours may be taken from a group and, for the remaining elective hours, advanced courses of related subject matter may be chosen.

Music may be added to any group.

Advertising, Buying, and Salesmanship

FIRST SEMESTER

| | |
|------------------------------|--------|
| Design A | |
| App. Art 106 | 3(1-6) |
| Clothing Salesmanship | |
| Clo. and Text. 130..... | 2(2-0) |
| Business English | |
| Engl. 122 | 3(3-0) |
| Oral English I | |
| Engl. 128 | 3(3-0) |
| Industrial Feature Writing I | |
| Ind. Jour. 167 | 2(2-0) |
| Technical Writing | |
| Engl. 207 | 2(2-0) |

SECOND SEMESTER

| | |
|---------------------------|--------|
| Principles of Advertising | |
| Ind. Jour. 179 | 3(3-0) |
| Advertising English | |
| Engl. 125 | 3(3-0) |
| Applied Psychology | |
| Educ. 215 | 2(2-0) |
| Accounting Practice | |
| Math. 134 | 3(3-0) |
| Business Management | |
| Econ. 126 | 2(2-0) |

Certificate Requirements for Vocational Home Economics Teaching

| | |
|---------------------------------|--------|
| Educational Administration A | |
| or B | |
| Educ. 105 or 106..... | 3(3-0) |
| Special Methods in the Teaching | |
| of Home Economics | |
| Educ. 132 | 3(3-0) |
| Child Welfare | |
| Hshld. Econ. 203 | 3(3-0) |

| | |
|------------------------------|--------|
| Educational Sociology A or B | |
| Educ. 118 or 119 | 3(3-0) |
| Home Economics Education | |
| Educ. 122 | 3(3-0) |
| Supervised Observation and | |
| Teaching in Home Economics | |
| Educ. 160 | 3(-) |
| Practice Course in Household | |
| Management | |
| Hshld. Econ. 116 | 3(0-9) |
| Electives | 5(-) |

Clothing and Textile Work

| | |
|---------------------------------|--------|
| Household Entomology | |
| Ent. 106 | 2(2-0) |
| Problems in Household Economics | |
| Hshld. Econ. 243 | 2(2-0) |
| Clothing Salesmanship | |
| Clo. and Text. 130..... | 2(2-0) |
| Problems in Hygiene of Clothing | |
| Clo. and Text. 240..... | 2 to 4 |
| American Industrial History | |
| Hist. 105 | 3(3-0) |

| | |
|-----------------------------|--------|
| Principles of Art and their | |
| Application | |
| Ap. Art 124 | 3(3-0) |
| Labor Problems | |
| Econ. 111 | 2(2-0) |
| Clothing Economics | |
| Clo. and Text. 237..... | 2(2-0) |
| Social Problems | |
| Econ. 257 | 2(2-0) |

Designing and Decorating

| | | | |
|----------------------------|---------|------------------------------|---------|
| Free-hand Drawing I | | Free-hand Drawing II | |
| Arch. 111 | 2 (0-6) | Arch. 114 | 2 (0-6) |
| Woodwork I | | Woodwork II | |
| Shop 105 | 1 (0-3) | Shop 110 | 1 (0-3) |
| Photography | | Principles of Art and their | |
| Physics 120 | 2 (1-3) | Application | |
| Landscape Gardening I | | Ap. Art 124 | 3 (3-0) |
| Hort. 125 | 2 (0-6) | Landscape Gardening II | |
| Principles of Topography I | | Hort. 301 | 3 (0-9) |
| Ind. Jour. 101 | 3 (2-3) | Principles of Topography II | |
| | | Ind. Jour. 104 | 3 (2-3) |
| | | Handicraft | |
| | | Ap. Art 112 | 2 (0-6) |
| | | Interior Decoration and | |
| | | Furnishing | |
| | | Ap. Art 114 | 3 (1-6) |
| | | The Arts and Crafts Movement | |
| | | Engl. 295 | 2 (2-0) |

Food and Nutrition

(Research Hospital Dietetics; Public Health Work; Specialized Teaching)

| | | | |
|------------------------------|---------|------------------------------|----------|
| Physical Chemistry | | Physiological Chemistry | |
| Chem. 206 | 5 (3-6) | Chem. 231 | 5 (3-6) |
| Microchemical Methods of | | Biochemical Preparation | |
| Analysis | | Chem. 234 | 5 (0-15) |
| Chem. 245 | 1 (0-3) | Quantitative Analysis | |
| Anatomy and Physiology | | Chem. 241 | 5 (1-12) |
| Anat. 131 | 3 (2-3) | Food Analysis | |
| Hygiene Bacteriology | | Chem. 257 | 3 (0-9) |
| Bact. 206 | 4 (2-6) | Household Chemistry | |
| Problems in Food Economics | | Chem. 265 | 3 (1-6) |
| and Nutrition I | | Histology I | |
| Food and Nut. 248..... | 2 to 4 | Path. 101 | 3 (1-6) |
| Food Economics and Nutrition | | Food Economics and Nutrition | |
| Seminar I | | Seminar II | |
| Food and Nut. 251..... | 2 (2-0) | Food and Nut. 252 | 2 (2-0) |
| Field Work in Nutrition | | Dietetics for Abnormal | |
| Food and Nut. 215..... | 1 to 3 | Conditions | |
| | | Food and Nut. 204 | 2 (2-0) |

Homemaking

| | | | |
|------------------------|---------|-----------------------------|---------|
| Child welfare | | Interior Decoration and | |
| Hshld. Econ. 203 | 3 (3-0) | Furnishing | |
| Home Nursing | | Ap. Art 114..... | 3 (1-6) |
| Hshld. Econ. 109 | 1 (0-3) | Principles of Art and their | |
| The Modern Family | | Application | |
| Hshld. Econ. 231 | 2 (2-0) | Ap. Art 124 | 3 (3-0) |
| Household Entomology | | History of the Home | |
| Ent. 106 | 2 (2-0) | Hist. 225 | 3 (3-0) |
| Sociology | | Household Chemistry | |
| Econ. 151 | 3 (3-0) | Chem. 265 | 3 (1-6) |
| | | Pathology of Vegetable Food | |
| | | Products | |
| | | Bot. 121 | 3 (1-6) |
| | | Rural Sociology | |
| | | Econ. 156 | 3 (3-0) |
| | | Rural Leadership | |
| | | Econ. 261 | 1 (1-0) |
| | | Clothing III | |
| | | Clo. and Text. 125..... | 2 (0-6) |

Homemaking

(Special Rural Problems)

| | | | |
|---|--------|--|---------|
| Poultry Bacteriology Bact. 216 | 3(1-6) | Plant Propagation Hort. 101 | 3(2-3) |
| Rural Sociology Econ. 156 | 3(3-0) | Orcharding Hort. 107 | 2(1-3) |
| Home Nursing Hshld. Econ. 109 | 1(0-3) | Small Fruits Hort. 110 | 2(2-0) |
| Rural Organization Econ. 264 | 2(2-0) | Market Gardening Hort. 210 | 3(2-3) |
| Rural Leadership Econ. 261 | 1(1-0) | Home Dairying Dairy Husb. 112 | 1½(2-3) |
| | | Home Poultrying Poult. Husb. 102 | 1½(3-0) |
| | | Dairy Bacteriology Bact. 211 | 3(1-6) |
| | | Apiculture Ent. 111 | 3(2-3) |
| | | Farm Sanitation and Water Supply Farm Eng. 119 | 2(2-0) |

Institutional Management

| | | | |
|--|--------|---|--------|
| Institutional Management I Hshld. Econ. 221 | 3(1-6) | Institutional Management II Hshld. Econ. 226 | 4(3-3) |
| Business English I Engl. 122 | 3(3-0) | Problems in Institutional Administration Hshld. Econ. 247 | 2 to 5 |
| Oral English I Engl. 128 | 3(3-0) | Institutional Furnishings Ap. Art 116 | 3(1-6) |
| Business Management Econ. 126 | 2(2-0) | Institutional Accounting Math. 131 | 3(3-0) |
| Technical Writing Engl. 207 | 2(2-0) | Advertising English Engl. 125 | 3(3-0) |
| | | Applied Psychology Educ. 215 | 2(2-0) |
| | | Labor Problems Econ. 111 | 2(2-0) |

Lecturing and Demonstrating

| | | | |
|--|--------|--|--------|
| Oral English I Engl. 128 | 3(3-0) | Oral English II Engl. 131 | 3(3-0) |
| Public Speaking I Pub. Spk. 101 | 2(2-0) | Public Speaking II Pub. Spk. 102 | 2(2-0) |
| Extempore Speech I Pub. Spk. 106 | 2(2-0) | Extempore Speech II Pub. Spk. 108 | 2(2-0) |
| Sociology Econ. 151 | 3(3-0) | Applied Psychology Educ. 215 | 2(2-0) |
| Technical Writing Engl. 207 | 2(2-0) | Rural Sociology Econ. 156 | 3(3-0) |
| Practice in Food Demonstrations Food and Nut. 117 | 1(0-3) | Rural Leadership Econ. 261 | 1(1-0) |

Nursing

(For a diploma in nursing and the Bachelor of Science degree, the five-year curriculum must be chosen, replacing twenty-six required credits and fifteen elective credits of the four-year curriculum with nursing training. See page 186.)

| | | | |
|--|---------|--|---------|
| Materia Medica II Vet. Med. 156 | 2(2-0) | Materia Medica I Vet. Med. 151 | 2(2-0) |
| First year at Hospital to replace first semester Junior year | 17(-) | General Microbiology Bact. 101 | 3(1-6) |
| Electives | 6(-) | Second year at Hospital to replace second semester Junior year | 17(-) |
| | | Electives | 5(-) |

Sanitary Science; Food and Market Inspection

| | | | |
|-------------------------|--------|-------------------------------|-----------|
| Hygienic Bacteriology | | Dairy Chemistry | |
| Bact. 206 | 4(2-6) | Chem. 254 | 3(1-6) |
| Quantitative Analysis I | | Chemistry of Meats | |
| Chem. 150 | 2(-6) | Chem. 255 | 3(1-6) |
| | | Food Analysis | |
| | | Chem. 257 | 3(0-9) |
| | | Pathogenic Bacteriology I | |
| | | Bact. 111 | 4(2-6) |
| | | Water Purification and Sewage | |
| | | Disposal | |
| | | Bact. 221 | 3(1-6) |
| | | Pathology of Vegetable Food | |
| | | Products | |
| | | Bot. 121 | 3(1-4, 2) |
| | | Meat Inspection | |
| | | Path. 216 | 2(2-0) |

Social Welfare Work

| | | | |
|-------------------------|--------|--------------------------------|--------|
| Child Welfare | | Labor Problems | |
| Hshld. Econ. 203 | 3(3-0) | Econ. 111 | 2(2-0) |
| Home Nursing | | Current Economic Problems | |
| Hshld. Econ. 109 | 1(0-3) | Econ. 225 | 2(2-0) |
| The Modern Family | | Rural Sociology | |
| Hshld. Econ. 231 | 2(2-0) | Econ. 156 | 3(3-0) |
| Problems in Household | | Social Problems | |
| Economics | | Econ. 257 | 2(2-0) |
| Hshld. Econ. 243 | 2 to 5 | Rural Leadership | |
| Sociology | | Econ. 261 | 1(1-0) |
| Econ. 151 | 3(3-0) | Modern Europe | |
| Pan-America | | Hist. 223 | 3(3-0) |
| Hist. 207 | 2(2-0) | Immigration and International | |
| Rural Organization | | Relations | |
| Econ. 264 | 2(2-0) | Hist. 228 | 2(2-0) |
| Rural Leadership | | Problems in Child Welfare | |
| Econ. 261 | 1(1-0) | Hshld. Econ. 253 | 2 to 5 |
| Field Work in Nutrition | | Social Case Work with Families | |
| Food and Nut. 215 | 1 to 3 | Hshld. Econ. 235 | 2 to 4 |

State Certificate Requirements for General Teaching

| | | | |
|--|--------|------------------------------|-----------|
| Educational Administration A | | Educational Psychology | |
| or B | | Educ. 109 | 3(3-0) or |
| Educ. 105 or 106 | 3(3-0) | Educational Sociology A or B | |
| | | Educ. 118 or 119 | 3(3-0) |
| Additional Educational Courses..... 9(9-0) | | | |

(NOTE.—Home Economics Education (3 hrs.) and Special Methods in the Teaching of Home Economics (3 hrs.) should be included by students who wish to teach home economics. Modern Europe or Advanced English should be added by those expecting to teach these subjects. Additional courses may be chosen in the line of the student's interests.)

Applied Art

Professor HOLMAN
Instructor EVERHARDY

Assistant EVANS

Taste is cultivated through the impressions received in everyday surroundings and not through the occasional visits to art galleries. We are not so sensitive to discords in color and line as we are to discords in sound, because we have not trained our eyes as we have our ears. "The study of design furnishes a means of exercising and thus developing good taste in connection with the things which make up environment of everyday life and of awakening appreciation in nature and in art." Home decoration is a study of the factors which produce beautiful surroundings that make for enjoyment and peace. Each course consists of lectures, studio laboratory work, field observation work, and reading.

COURSES IN APPLIED ART

FOR UNDERGRADUATES

101. DESIGN. Freshman year, first semester. Class work, one hour; studio, six hours. Three semester credits. Professor Holman and Misses Everhardy and Evans.

A study is made of the principles which control the use of color and the selection and arrangement of elements in the production of objects themselves and in their uses as parts of a whole. Many exercises are given in which clothing and home furnishings are scored as to design. A natural motif is adapted to material, function and form.

106. DESIGN A. Freshman year, first semester. Class work, one hour; studio, six hours. Three semester credits. To be taken as a substitute for Design by students who have had color and design work in high school. Professor Holman and Miss Everhardy.

A further study is made of harmonies, adaptation of natural motifs, and design as applied to fabrics and other materials. Art masterpieces and articles of common use are studied according to the principles of design and color.

108. HOUSE FURNISHINGS. Freshman year, second semester. Class work, one hour; studio, three hours. Two semester credits. Prerequisite: Design or Design A. Professor Holman.

Design is the selection and arrangement of materials for the making of useful and beautiful things. The decorative phase of design is studied in the solving of problems which occur in the furnishings of the house.

112. HANDCRAFT. Elective, second semester. Studio, six hours. Two semester credits. Prerequisite: Design or Design A. Miss Everhardy.

Both constructive and decorative designs are studied in handicraft work. Original designs are carried out in the following mediums: leather, clay, metal, reeds, and other materials.

114. INTERIOR DECORATION AND FURNISHING. Elective, second semester. Class work, one hour; studio, six hours. Three semester credits. Prerequisite: Design or Design A. Professor Holman.

This is a study of color, form and arrangement of home furnishings. Wall coverings, carpets, pictures, furniture, etc., are discussed and studied so that the student may recognize and appreciate what is appropriate and beautiful. A study is made of fine arts, of handicrafts, and of the history of furnishings. Problems in spacing and coloring of side walls are discussed and are developed in water color and decorating materials.

116. INSTITUTIONAL FURNISHINGS. Elective, second semester. Class work, one hour; studio, six hours. Three semester credits. Prerequisite: Design or Design A. Miss Everhardy.

A study is made of the fundamental principles of design, including color, form, and arrangement. These principles are applied to problems involving the selection and use of the following: wall, floors, furniture, finishes, coverings, linen, china, and silver.

120. SKETCHING. Elective, second semester. Studio, six hours. Two semester credits. Prerequisite: Design or Design A. Professor Holman.

Objects are sketched singly and in groups in the studio and out of doors. The media employed are pencil, charcoal, and brush. The aim is to train the student to see forms in perspective and to represent them with sufficient accuracy to apply in illustrating the more practical problems in the other courses in the department.

124. PRINCIPLES OF ART AND THEIR APPLICATION. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Design or Design A. Professor Holman.

A general survey is made of art periods as an index to what the art quality is. An examination is made of the religious, political, and social aspects of art expression. Architecture, furniture, textiles, sculpture, pictures, and the lesser art objects are compared as to their art quality. The modern fields of landscape, architecture, furnishings, clothing, advertising, etc., are surveyed. The principles controlling art expression are applied to these modern fields of life.

Clothing and Textiles

Professor GLANTON
Associate Professor COWLES
Instructor FECHT
Instructor McDONALD

Instructor WORCESTER
Instructor SCHELL
Assistant POLSON

Clothing is an important factor in both the physiological and psychological well-being of the individual and of the family. The wise selection of the clothing requires a high degree of skill in the application of hygienic, economic, and æsthetic principles. The preservation and care of clothing are based upon a practical knowledge of chemistry, entomology, and bacteriology. In the construction of garments, art, applied art, and technique are presented in their proper relations in order to train students in fundamental principles and enable them to utilize these principles in their everyday practices. In this department advanced courses are offered for students who wish electives which lead to vocational, professional, and business positions.

COURSES IN CLOTHING AND TEXTILES

FOR UNDERGRADUATES

101. CLOTHING I. Freshman year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Associate Professor Cowles, Miss McDonald, Miss Worcester, and Miss Polson.

The aim of this course is to train for efficiency in handling sewing equipment and materials. Attention and adaptation of commercial patterns, kinds, qualities, and quantities of materials are discussed. Emphasis is laid on principles of hygiene and sanitation as applied to clothing.

Laboratory.—The planning and construction of garments, including infants' wear, and simple problems in millinery are taken up in the laboratory. Rapid construction and labor-saving methods are emphasized.

106. **COSTUME DESIGN I.** Freshman year, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Design (Ap. Art 101) or Design A (Ap. Art 106). Miss Schell and Miss Polson.

This course treats of art in dress and comprises the application of the principles of color, harmony, and design; individual requirements in color and line; original problems in designs for decoration of costumes and for costumes in pencil, pen and ink, and water colors. This course is directly related to the construction of garments. The aim is to develop good taste in dress.

108. **COSTUME DESIGN II.** Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: Costume Design I. Miss Schell.

Historic costume in its relationship to the present-day mode and to costumes for amateur performances or pageants, is studied in this course. Opportunity is offered for draping materials from original designs. Considerable attention is given to color and to the finishing touches of artistry necessary to complete a charming and appropriate costume.

111. **CLOTHING II.** Sophomore year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Clothing I or its equivalent. Associate Professor Cowles, Miss McDonald, and Miss Worcester.

This course considers the manufacture and selection of clothing; clothing industries and clothing standards in their relation to the economic and social life of the community; comparison of home- and factory-made garments; standardization of dress, its advantages and disadvantages; clothing budgets for individuals and family groups. Economics of clothing is emphasized.

Laboratory.—The laboratory exercises consist of group work in making entire outfits of clothing for individuals of different ages or the planning and making of garments required in the wardrobe of a family.

116. **TEXTILES.** Junior year, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Organic Chemistry. Miss Fecht.

This course considers the social and economic development of the textile industry, from the "industrial revolution" to the present time. The combination of art, science, and mechanics that makes possible the elaborateness of modern textiles is given due attention. The principal aim of the course is the development of a clear and sound judgment in the selection of textile fabrics for household and personal use.

Laboratory.—Chemical, physical, microscopic tests on textile fibers, yarns, and fabrics form a large part of the laboratory work. These include the simple tests that may be performed in any home, as well as technical, scientific tests requiring elaborate equipment. Laundry processes are studied and compared.

117. **HISTORY OF TEXTILES.** Elective, first semester. Class work, two hours. Two semester credits. Miss Fecht.

This course is planned for students interested in the early development of the textile industry from primitive ages up to the "industrial revolution" and the inauguration of the factory system. The growth and production of the four principal fibers of commerce are studied, together with unusual characteristics of other fibers not so important.

125. **CLOTHING III.** Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisites: Clothing I, or its equivalent, and Costume Design. Open to seniors and others upon consultation with the instructor. Miss Polson.

The course deals with the æsthetic and modish adaptation of materials to the individual, and aims to teach self-expression through dress. Several original designs in dressmaking and millinery are carried out in materials approved by the instructor. Students are allowed much freedom in the selection and execution of the problems.

130. CLOTHING SALESMANSHIP. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Costume Design I. Open to students upon consultation with the instructor. Professor Glanton.

This course provides an introduction to the problems which present themselves to those preparing for positions as executives in department stores, service managers in factories, or teachers of salesmanship in high schools. Study of department-store policies and systems, the psychology of selling, the responsibility of the sales person to the customer. Conferences and reports are required. Actual practice in department stores is very desirable for all students.

FOR GRADUATES AND UNDERGRADUATES

237. CLOTHING ECONOMICS. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Economics. Professor Glanton.

This course includes a study of the organization of the clothing trades and industries; of wholesale and retail clothing markets; of wages and standards of efficiency in workmanship; conditions of work in the textile and clothing industries; standardization of fabrics; study of the budget for clothing and household textiles. Topics are assigned for reading and investigation and written reports are required.

240. PROBLEMS IN HYGIENE OF CLOTHING. Elective, first semester. From two to four semester credits. Prerequisites: Textiles, Embryology and Physiology, and Microbiology. Professor Glanton.

Students are assigned special problems for investigation of clothing in relation to health and its effect upon anatomical form, muscular development and physiological functions.

FOR GRADUATES

301. RESEARCH IN CLOTHING AND TEXTILES. Elective, both semesters. Credit as arranged. Prerequisites: consult instructors. Professor Glanton, Associate Professor Cowles.

A research problem in the hygienic or economic aspects of clothing or an investigation of textiles may be chosen as the basis of a thesis for the master's degree.

Food Economics and Nutrition

Professor BOGERT
Associate Professor ROTHERMEL
Assistant Professor PITTMAN
Instructor TACKABERRY

Instructor HUDSON
Assistant TRAIL
Assistant WILLIAMS*
Fellow KIRKPATRICK

Food is one of the determining factors in the health of the individual and of the family. The selection of wholesome and economical food requires the constant application of chemistry and of sanitary science. The preparation and preservation of food involve processes dependent upon physics, chemistry, and bacteriology. In the modern science of nutrition and dietetics, the student learns the chemical and physiological principles involved in the nutritive processes of the body and the quantitative application of these principles in planning food for the individual and the group. Science, applied science, and practice are presented in their proper relations in order to train the student in fundamental principles and to enable her to gain by experience methods of translating these principles into her everyday household practices. Advanced courses in this department provide for vocational and professional positions.

* Resigned, December 31, 1920.

COURSES IN FOOD ECONOMICS AND NUTRITION

FOR UNDERGRADUATES

101. **FOODS I.** Freshman year, both semesters. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: entrance Physics; parallel, Chemistry I. Miss Tackaberry, Miss Hudson, Miss Trail, and Miss Kirkpatrick.

The class work includes a brief survey of the history and development of cookery and cooking utensils, consideration of the principles involved in the different methods of cooking and in the preservation of foods.

Laboratory.—Experimental work and practical cookery, illustrating the various methods of preparing foods, form the basis of the laboratory work, which also includes the study of stoves, fuels, food preservation, and simple meal planning.

104. **ELEMENTARY FOODS AND NUTRITION.** Elective, second semester. Class work, one hour. One semester credit. Professor Bogert.

This course consists of lectures and demonstrations offered for students in divisions other than the Division of Home Economics, who desire to obtain a popular knowledge of the composition of food and the principles involved in selecting food for the individual or the family group. It will not be given for a class of fewer than fifteen students.

106. **FOODS II.** Sophomore year, second semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisites: Organic Chemistry, Foods I or its equivalent. Assistant Professor Pittman, Miss Trail, Miss Hudson and Miss Tackaberry.

This course emphasizes the classification, composition, occurrence, and general properties of foodstuffs. Food values in relation to cost are considered, together with the legal and sanitary aspects of food products handled in commerce.

Laboratory.—Food products are handled in experiments which demonstrate the presence of the proximate principles and the various inorganic constituents, the changes they undergo in cooking, and their nutritive value as affected by admixture with other food materials. Recipes are compiled. Practice is given in judging food preparations.

112. **HUMAN NUTRITION.** Junior year, both semesters. Lectures and recitations, three hours. Three semester credits. Prerequisites: Organic Chemistry, Embryology and Physiology, and Foods II.* Dean Thompson and Professor Bogert.

This course comprises a study of the special characteristics and nutritive functions of the food constituents; the methods of investigation which have established the quantitative basis in dietetics; the digestive and metabolic processes and products with emphasis upon energy relations; the quantitative relations of the ash constituents; nitrogen and mineral balances; comparative economy in nutrition and growth of different types of food materials.

117. **PRACTICE IN FOOD DEMONSTRATIONS.** Elective, first semester. Laboratory, three hours. One semester credit. Prerequisite: Foods II. Assistant Professor Pittman, with the assistance of other members of the departmental faculty.

This course is designed to meet the needs of those who plan to enter extension work, to become commercial demonstrators of food products, or to teach food study. Instruction is given in the technique of food demonstrations, and each student is allowed opportunity for practice work in various types of demonstrations.

* Students from other divisions desiring to elect Human Nutrition may substitute an equivalent number of hours in other sciences for Embryology and Physiology, and Foods II.

FOR GRADUATES AND UNDERGRADUATES

201. **DIETETICS.** Senior year, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisites: Human Nutrition and Foods II. Associate Professor Rothermel.

This course deals with the application of the principles of human nutrition to the practical feeding problems of the individual and the group. The following topics receive attention: daily food requirements for the normal individual throughout infancy, childhood, adolescence, adult life, and old age; typical dietaries for each period of life; milk formulæ; the problem of satisfying the diverse requirements in families and other groups.

Laboratory.—Studies in weight measures and cost of some of the common food materials; calculations and quantitative preparation of standard portions and combinations of foods; analyses of recipes; computation and scoring of dietaries with special regard to nutritive requirements for varying physiologic, economic, and social conditions; practice in marketing and serving, comprise the work in the laboratory. (Graduate students are required to do an assigned problem in place of the practice in marketing and serving included in the laboratory for undergraduates.)

204. **DIETETICS FOR ABNORMAL CONDITIONS.** Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Dietetics. Associate Professor Rothermel.

Students who expect to qualify as professional dietitians, either in hospital work or elsewhere, should elect this course. A study is made of the varying dietetic requirements in different pathological conditions, such as diabetes, nephritis, gout, gastric ulcer, etc. Attention is given to the special foods used in such conditions, and dietaries are computed and scored.

215. **FIELD WORK IN NUTRITION.** Elective, first semester. From one to three semester credits. Hours to be arranged. Prerequisites: Human Nutrition, and Dietetics. Associate Professor Rothermel.

This course comprises survey work along nutritional lines and corrective work with malnourished individuals, either separately or in groups.

243. **PROBLEMS IN FOODS I.** Elective, first semester. From one to three semester credits. Hours to be arranged. Prerequisites: Foods II and Human Nutrition. Assistant Professor Pittman.

Special problems are assigned to students for individual consideration.

244. **PROBLEMS IN FOODS II.** Elective, second semester. From one to three semester credits. Hours to be arranged. Prerequisites: Foods II, and Human Nutrition. Assistant Professor Pittman.

This course may be taken as a continuation of course 243 or may be elected independently.

248. **PROBLEMS IN FOOD ECONOMICS AND NUTRITION I.** Elective, first semester. From two to five semester credits, depending upon the nature of the problem. Conferences, laboratory work, and reports. Open to senior and graduate students. Dean Thompson and Professor Bogert.

The work of this course may consist of an assigned problem in the nutritive value of foods; a feeding experiment; dietary studies; or practice in the methods commonly used in the simpler experiments in nutrition.

249. **PROBLEMS IN FOOD ECONOMICS AND NUTRITION II.** Elective, second semester. From two to five semester credits, depending upon the nature of the problem. Conferences, laboratory work, and reports. Open to senior and graduate students. Dean Thompson and Professor Bogert.

This course may be taken as a continuation of course 248 or may be elected independently.

251. **FOOD ECONOMICS AND NUTRITION SEMINAR I.** Elective, first semester. Class work, two hours. One or two semester credits. Prerequisite: Human Nutrition. Professor Bogert.

This is a course of assigned reading and discussion of topics in the fields of food economics and nutrition. Special attention is given to recent literature, which bears upon problems in dietetics, in both normal and pathological conditions; upon growth and upon normal and subnormal nutrition in infancy and childhood. Feeding experiments are compared and discussed. A reading knowledge of modern languages, while not a fixed requirement, is urged as of especial advantage in this course.

252. **FOOD ECONOMICS AND NUTRITION SEMINAR II.** Elective, second semester. Class work, two hours. One or two semester credits. Prerequisite: Human Nutrition. Professor Bogert.

This course may be taken as a continuation of course 251 or may be elected independently.

FOR GRADUATES

305. **RESEARCH IN FOOD ECONOMICS AND NUTRITION.** Elective, both semesters. Credit as arranged. Prerequisites: Consult instructors. Dean Thompson and Professor Bogert.

Individual research problems are assigned, which may form the basis for the thesis submitted for a master's degree.

Household Economics

Professor KNEELAND
Assistant Professor LEAZENBY
Assistant Professor BALDWIN
Instructor LAUDER

Instructor FORD*
Assistant KRAMER
Fellow ANDERSON†

The successful administration of the home, whether it be for the family or for the larger institutional group, depends upon the wise expenditure of time, money, and effort, the maintenance of healthful and comfortable home conditions, and an appreciation of the importance of the family and the home and their relation to the rest of society. Through the courses in this department, therefore, training is given in household administration, in standards of living and the use of the family income, in institutional administration, in home nursing and sanitation, and in family and child welfare.

Students who wish to prepare themselves as social workers, directors of residence, cafeteria or lunch-room managers, hospital managers or dietitians, or teachers or demonstrators in home economics, will find suitable electives among the courses offered by this department.

COURSES IN HOUSEHOLD ECONOMICS

FOR UNDERGRADUATES

103. **ELEMENTARY HYGIENE AND HOME NURSING.‡** Freshman year, second semester. Class work, three hours. Three semester credits. Miss Lauder.

* In charge of correspondence work in Household Economics, Home Study Service, Division of College Extension.

† Resigned March 1, 1921.

‡ This course may be taken in place of Foods I, with the approval of the Dean of the Division.

Emphasis is placed upon personal hygiene as a means of maintaining and improving health in the home. Practical methods in the home care of the sick and the treatment of emergencies are studied and demonstrated.

106. **HOUSEHOLD MANAGEMENT.** Junior year, both semesters. Class work, two hours. Two semester credits. Prerequisites: Household Physics, Foods II, Clothing II. Professor Kneeland.

This course includes a study of the organization and simplification of housework through efficiency in house planning and construction, in the selection and arrangement of equipment, and in methods of housekeeping; standards of living and family expenditures, budgets, and accounts; problems of household service; experiments in coöperative laundering, cooking, etc.; the amount of time necessary for housework; and the use of leisure time.

109. **HOME NURSING.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Household Microbiology, Embryology and Physiology. Miss Lauder.

Training is given, through class discussions and demonstrations and through laboratory practice by the student, in the home care of the sick and the treatment of injuries, wounds, and other emergencies.

116. **PRACTICE COURSE IN HOUSEHOLD MANAGEMENT.** Elective, both semesters. Required of students who wish to qualify as home economics teachers under the Smith-Hughes requirement for vocational high schools. Three semester credits. Prerequisites: Household Physics, and Foods II. Prerequisite or parallel: Household Management. Consult instructor. Assistant Professor Leazenby.

This course is conducted in the practice house. The students live in a group and perform the usual household tasks, including marketing, planning, cooking and serving meals, caring for the rooms, planning the household budget, and keeping the accounts.

FOR GRADUATES AND UNDERGRADUATES

203. **CHILD WELFARE.** Elective, both semesters. Required of students who wish to qualify as home economics teachers under the Smith-Hughes requirement for vocational high schools. Class work, three hours. Three semester credits. Prerequisites: Embryology and Physiology, Household Microbiology, Psychology, Human Nutrition, Clothing II, and Textiles. Assistant Professor Leazenby.

A study is made of the needs of the child and of the methods of meeting these needs through the care of the child in the home and through community and child-welfare activities. The topics considered include the health problems of mother and child, child mentality and management, play and recreation, child labor, juvenile delinquency, and the special needs of defective and dependent children.

211. **SANITATION AND PUBLIC HEALTH.** Senior year, both semesters. Class work, three hours. Three semester credits. Prerequisites: Household Physics, Embryology and Physiology, Household Microbiology. Miss Lauder.

This course deals with the household as a factor in health conservation, emphasis being placed upon the interrelation of home and community health. It includes a study of the influence upon health of the location, ventilation, heating, lighting, and water supply of the house; the sanitary disposal of sewage and other wastes; housing conditions and their control; vital statistics; the prevention and control of communicable and noncommunicable diseases; mental hygiene; public health activities and administration in relation to the home.

221. INSTITUTIONAL MANAGEMENT I. Elective, both semesters. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Foods II; prerequisite or parallel: Human Nutrition. Assistant Professor Baldwin and Miss Kramer.

This course deals with food problems of institutions, and includes the study of marketing, preparation of food, arrangement of menus, and cost of service for different types of institutions.

Laboratory.—The laboratory work is carried on in the College cafeteria, where food in large quantities is prepared for serving.

226. INSTITUTIONAL MANAGEMENT II. Elective, both semesters. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: Institutional Management I. Assistant Professor Baldwin and Miss Kramer.

This course includes a study of the various types of institutions; the qualifications and duties of the manager; the planning, equipping, and general care of buildings and rooms; the organization of work; the management of employees; institutional accounting; office management.

Laboratory.—The laboratory work consists of practice in the various phases of institutional management in the College cafeteria. Opportunity is given for a visit to representative types of institutions in Kansas City.

231. THE MODERN FAMILY. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: senior or graduate standing. Consult instructor. Professor Kneeland.

A study is made of the functions of the modern family, based upon a brief survey of the historical background, and of the various problems which confront it, such as marriage rates and marriage laws, birth rates, the influence of the death or illness of parents, of low wages, unemployment and bad housing, the employment of mothers, family neglect, desertion, and divorce. Special emphasis is placed on the conditions met by the social case worker and on social programs for the maintenance and improvement of family welfare.

235. SOCIAL CASE WORK WITH FAMILIES. Elective, both semesters. Class work, one hour. Field work, three, six, or nine hours. Two to four semester credits. Prerequisites: Household Management, Clothing II. Prerequisite or parallel: Sanitation and public Health, Dietetics, Child Welfare, The Modern Family, and Sociology or Rural Sociology. Consult instructor. Assistant Professor Leazenby.

The class work consists of a study of the methods of social case work and their application to families in need of special care. The problems of investigation, weighing of evidence, sources of aid, plans of action, and follow-up work are considered. The rest of the time is spent in supervised field work with local social agencies.

243. PROBLEMS IN HOUSEHOLD ECONOMICS. Elective, both semesters. One to five semester credits. Prerequisite: Household Management. Consult instructor. Professor Kneeland.

Special problems are selected for individual investigation in standards of living and family expenditures, housing, household equipment, organization and methods of housework, use of time freed from housework, or social aspects of the household and of the family. Conferences are held and reports are made at hours arranged by appointment.

247. PROBLEMS IN INSTITUTIONAL ADMINISTRATION. Elective, both semesters. One to five semester credits. Prerequisite: Institutional Management I. Prerequisite or parallel: Institutional Management II. Consult instructor. Assistant Professor Baldwin.

Special problems in the administration of cafeteria, lunch and tea rooms, dining halls, dormitories, clubs, and other institutions, are selected

for individual investigation. Conferences are held and reports are made at hours arranged by appointment.

253. PROBLEMS IN CHILD WELFARE. Elective, both semesters. One to five semester credits. Prerequisite: Child Welfare. Consult instructor. Assistant Professor Leazenby.

A special problem in some phase of child welfare is selected for individual investigation. Conferences are held and reports are made at hours arranged by appointment.

FOR GRADUATES

301. RESEARCH IN HOUSEHOLD ECONOMICS I. Elective, first semester. Two to ten semester credits. Prerequisites: consult instructors. Professor Kneeland, and Assistant Professors Leazenby and Baldwin.

An individual research problem is investigated in the field of household administration, institutional administration, child welfare, or family welfare. The work of the course may form part or all of the basis for the master's thesis.

306. RESEARCH IN HOUSEHOLD ECONOMICS II. Elective, second semester. Two to ten semester credits. Prerequisites: consult instructors. Professor Kneeland, and Assistant Professors Leazenby and Baldwin.

This course may be taken as a continuation of course 301, or may be elected independently. The work of the course may form part or all of the basis for a master's thesis.

Home Economics in the Summer School

In addition to instruction in various branches of home economics available to teachers during the regular College year, the College offers several courses in this subject in the Summer School. Instruction in these courses is intended to present correctly that which may be introduced successfully into graded schools and high schools. Students will be enrolled upon presentation of a teacher's certificate, or of a certified statement showing that two years' high-school work or its equivalent has been completed.

A special circular giving in detail the courses offered in the Summer School may be had by applying to the Vice President of the College. See, also, the article on Summer School in this catalogue.

Special Courses in Home Economics

The Housekeepers' Course, which is completed in fifteen weeks or less and is given each semester, and the one-year curriculum in Lunch-room Management are to be found grouped and described with other special courses in another part of this catalogue. They may be found by reference to the general index in the back of this book.

Division of General Science

JULIUS TERRASS WILLARD, *Dean*

In the class of colleges to which this institution belongs the classical studies of the older type of college are replaced by work in the sciences and in vocational subjects. A sound basis for technical training includes thorough training in mathematics, physical science, and biological science. It is believed also that education should include some preparation for the discharge of one's duties to the state and to the community in which he lives. It should afford him that discipline and culture which alone can give him a grasp of the relations among persons and activities, peoples and events, with breadth of view and tolerance of attitude, and hence an influence over his associates and fellow citizens of every station in life.

It is the province of the departments grouped in this division of the College to give this basic, scientific, cultural and disciplinary training. Their work is not only foundational, but it penetrates through all of the characteristic vocational courses of the institution, as the structural steel of the modern skyscraper penetrates the entire building and forms a secure framework and support for the more readily visible, and evidently important parts. These departments thus give unity to all of the four-year curricula, although presenting but few curricula that are distinctive of their own work. These, however, by means of electives and options, are susceptible of manifold modification and application.

CURRICULUM IN GENERAL SCIENCE

The curriculum in general science includes the fundamental training in English, mathematics, science, history, economics, military science, and physical training required in the several specialized vocational courses now offered by the College and chosen by the great body of our students. Its required subjects constitute the central educational basis of the institution. By means of a number of groups of electives, it gives an opportunity to students to advance themselves still further in these fundamental lines and to give special attention to some, instead of taking the technical subjects characterizing other courses. This opportunity meets the needs of several types of young people, among whom are: (1) Those who have not yet fully decided as to their vocation, but who wish an education that is strong and well balanced in respect to modern science and cultural subjects, as a foundation for further education or as a preparation for sound citizenship and intellectual satisfaction in life. (2) Those who are looking forward to teaching in the high schools of the state. The electives offered allow one to give special attention to mathematics, physical science, biological science, agriculture, home economics, history, economics, English, journalism, music, professional educational

subjects, and several other lines. (3) Those who are fitting themselves for research work in the sciences, especially as applied to agriculture, engineering, and other industries.

The elective groups offered in this curriculum are to a considerable extent made up of studies required in one or more of the specialized curricula. They provide also, however, advanced work not included in other curricula. The scientific work in connection with the Agricultural and Engineering Experiment Stations, and several fields of state investigation and service, calls for the operation of unusually well-equipped departments in the sciences, and excellent facilities for practical training in this work are thus afforded.

While the curriculum in general science offers a wide choice of electives, these may not be selected aimlessly, or with the idea of choosing the easiest, or of obtaining credit for miscellaneous subjects taken elsewhere or in other curricula. The studies of the freshman and sophomore years are basic and are required of all, without exception. They insure a broad and adequate foundation for subsequent work in the several lines of electives. The electives are to be chosen in groups, approved by the Faculty or by the dean of the Division of General Science, and in such manner as to give logical coherence to the curriculum as a whole. The elective portion of the curriculum, as thus made up, consists for the most part of several groups of two or more full studies or their equivalent. It is possible to include some single subjects that may be advantageously taken without others. Special combinations in sewing, cooking, and shop work have been planned to meet the needs of prospective teachers of manual training. Students changing from other curricula to that in general science receive credit for work done in the other curricula in so far as it can be fitted into the general plan of this one.

The curriculum in general science is thus many in one. Such various combinations of groups are possible that it is not practicable to print all of them in extended form. There are, therefore, formally presented here the required subjects of the curriculum in their specified order by years and semesters, together with a considerable number of groups of electives.

CURRICULUM IN INDUSTRIAL JOURNALISM

Knowledge is power only as it comes into the possession of those who can use it; it gives pleasure in direct proportion to the extent of its diffusion. A discovery is of but little value as long as the discoverer is the only one who knows of its existence, and the printed page is by far the most effective means of extending knowledge concerning it. Magazines and newspapers never sleep, nor do they take vacations, and their power to elevate mankind is incalculable. But printed knowledge becomes effective only as it is read, and to be widely read in this day it must stand out from the great mass of other matter and gain the attention and hold the interest of the reader. To do this its points must be sharp and easily seen, and the style must be attractive. On the other hand, if the presentation is not essentially true, the more attractive it is the worse it is, and the greater the harm that follows wide reading of it.

The curriculum in industrial journalism endeavors to give young men and women training which will enable them to write both truthfully and effectively, particularly upon industrial subjects. To such subjects the modern newspaper and the general magazine are giving constantly more attention, while there are also 500 agricultural publications and a greater number of class and trade publications which are largely or exclusively concerned with matters relating to industrial life. The training given by the College has enabled a goodly number of alumni to do successful work upon these publications.

The aim of the curriculum is to present such subjects as will enable the writer to see his work in proper perspective, to obtain authoritative knowledge of some field of industrial activity, and to write acceptably. The curriculum consequently offers, in the first place, fundamental studies of literary, social, and scientific character. Because of the materials with which journalism deals, it is highly desirable that the student obtain a clear knowledge of the social sciences and be able to read at least one current foreign language. Every student in the course is strongly urged to elect Spanish, French or German. In the second place, the student is required to elect subjects in agriculture, mechanic arts, applied science, or home economics, depending on the portion of the field of industrial journalism which he desires to enter, it being expected that every student graduated from the curriculum shall have special knowledge of some prominent line of industry. In the third place, the theory and practice of journalism are presented in a series of courses extending throughout the sophomore, junior, and senior years, and opportunity is offered for taking additional electives in journalism simultaneously with the required courses.

The College thus affords preparation for work in a wide and inviting field. Our unprecedented industrial achievements have been made by the application of discoveries in physical and biological science. Much of discovery and much of application are yet to come, and one who can write truthfully and attractively of that which is, and of that which comes, will find ample reward.

CURRICULA IN APPLIED CHEMISTRY

The facilities for instruction in chemistry are ample, and the demand of students for curricula planned especially to give chemical training is such that formulations have been made to meet the needs of those desiring to specialize in agricultural chemistry, biochemistry, or industrial chemistry. By suitable modifications of the curriculum in industrial chemistry the needs of students interested in chemical engineering are met. The instructional facilities of the Department of Chemistry reinforced by opportunities for practical work in connection with the researches of the experiment stations are such as to provide amply for this specialized training.

Curriculum in General Science

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | | SECOND SEMESTER | |
|----------------------------|-----------|-----------------------------|-----------|
| College Rhetoric I | | College Rhetoric II | |
| Engl. 101 | 3(3-0) | Engl. 104 | 3(3-0) |
| Chemistry I | | Chemistry II | |
| Chem. 101 | 5(3-6) | Chem. 102 | 5(3-6) |
| Plane Trigonometry* | | College Algebra* | |
| Math. 101 | 3(3-0) | Math. 104 | 3(3-0) |
| General Botany I | | General Botany II | |
| Bot. 101 | 3(1-4, 2) | Bot. 105 | 3(1-4, 2) |
| Current History | | Current History | |
| Hist. 126 | 1(1-0) | Hist. 126 | 1(1-0) |
| Library Methods | | Elective † | 2(-) |
| Lib. Ec. 101 | 1(1-0) | | |
| Military Science A-I (Men) | | Military Science A-II (Men) | |
| Mil. Tr. 101 | 1(0-4) | Mil. Tr. 102 | 1(0-4) |
| Physical Education M-I | | Physical Education M-II | |
| Phys. Ed. 103 | R(0-2) or | Phys. Ed. 104 | R(0-2) or |
| Physical Education W-I | | Physical Education W-II | |
| Phys. Ed. 151A | 1(0-3) | Phys. Ed. 152A | 1(0-3) |

SOPHOMORE

| FIRST SEMESTER | | SECOND SEMESTER | |
|----------------------------------|-----------|---------------------------------|-----------|
| English Literature I | | English Literature II | |
| Engl. 171 | 4(4-0) | Engl. 174 | 4(4-0) |
| English History | | Modern Europe | |
| Hist. 121 | 3(3-0) | Hist. 223 | 3(3-0) |
| General Physics I | | General Physics II | |
| Physics 135 | 4(3-3) | Physics 140 | 4(3-3) |
| General Zoölogy I | | General Zoölogy II | |
| Zoöl. 101 | 3(2-3) | Zoöl. 102 | 3(2-3) |
| Elective † | 3(-) | Elective † | 3(-) |
| Military Science A-III (Men) | | Military Science A-IV (Men) | |
| Mil. Tr. 103 | 1(0-4) | Mil. Tr. 104 | 1(0-4) |
| Physical Education M-III (Men) | | Physical Education M-IV (Men) | |
| Phys. Ed. 105 | R(0-2) or | Phys. Ed. 106 | R(0-2) or |
| Physical Education W-III (Women) | | Physical Education W-IV (Women) | |
| Phys. Ed. 153 | 1(0-3) | Phys. Ed. 154 | 1(0-3) |

JUNIOR

| FIRST SEMESTER | | SECOND SEMESTER | |
|---------------------|--------|----------------------|--------|
| American Government | | American History I | |
| Hist. 151 | 3(3-0) | Hist. 101 | 3(3-0) |
| Psychology C | | Economics | |
| Educ. 103 | 3(3-0) | Econ. 101 | 3(3-0) |
| Extempore Speech I | | General Microbiology | |
| Pub. Spk. 106 | 2(2-0) | Bact. 101 | 3(1-6) |
| Elective † | 8(-) | Elective † | 6(-) |

SENIOR

| FIRST SEMESTER | | SECOND SEMESTER | |
|------------------|---------|------------------|---------|
| Elective † | 16(-) | Elective † | 16(-) |

* Students who offer but one unit of algebra for admission take a five-credit course in College Algebra, Math. 107, the first semester, postponing trigonometry, current history, and library methods until the second semester. The additional credits are applied against electives.

† Electives are to be chosen, with the advice and approval of the dean, in groups of not less than eight semester credits, or in courses which extend fields already entered in the required work.

Curriculum in Industrial Journalism

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER

| | |
|-----------------------------------|----------|
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Chemistry I | |
| Chem. 101 | 5(3-6) |
| Principles of Typography I | |
| Ind. Jour. 101 | 3(2-3) |
| Library Methods | |
| Lib. Ec. 101 | 1(1-0) |
| Current History | |
| Hist. 126 | 1(1-0) |
| Options* | 3(-) |
| Industrial Journalism Lecture.... | R |
| Military Science A-I (Men) | |
| Mil. Tr. 101 | 1(0-4) |
| Physical Education M-I | |
| Phys. Ed. 103 | R(0-2)or |
| Physical Education W-I | |
| Phys. Ed. 151A | 1(0-3) |

SECOND SEMESTER

| | |
|-----------------------------------|----------|
| College Rhetoric II | |
| Engl. 104 | 3(3-0) |
| Chemistry II | |
| Chem. 102 | 5(3-6) |
| Principles of Typography II | |
| Ind. Jour. 104 | 3(2-3) |
| Current History | |
| Hist. 126 | 1(1-0) |
| Options* | 5(-) |
| Industrial Journalism Lecture.... | R |
| Military Science A-II (Men) | |
| Mil. Tr. 102 | 1(0-4) |
| Physical Education M-II | |
| Phys. Ed. 104 | R(0-2)or |
| Physical Education W-II | |
| Phys. Ed. 152A | 1(0-3) |

SOPHOMORE

FIRST SEMESTER

| | |
|-----------------------------------|-----------|
| English Literature I | |
| Engl. 171 | 4(4-0) |
| General Zoölogy I | |
| Zoöl. 101 | 3(2-3)or |
| General Botany I | |
| Bot. 101 | 3(1-4, 2) |
| Elementary Journalism | |
| Ind. Jour. 151 | 2(2-0) |
| Journalism Practice I | |
| Ind. Jour. 154 | 2(0-6) |
| French I | |
| Mod. Lang. 151..... | 3(3-0)or |
| Spanish I | |
| Mod. Lang. 176..... | 3(3-0) |
| Options* | 3(-) |
| Industrial Journalism Lectures... | R |
| Military Science A-III (Men) | |
| Mil. Tr. 103 | 1(0-4) |
| Physical Education M-III (Men) | |
| Phys. Ed. 105 | R(0-2)or |
| Physical Training W-III (Women) | |
| Phys. Ed. 153 | 1(0-3) |

SECOND SEMESTER

| | |
|-----------------------------------|--|
| English Literature II | |
| Engl. 14 | 4(4-0) |
| General Zoölogy II | |
| Zoöl. 102 | 3(2-3)if General Zoölogy I is chosen the first semester. |
| General Botany II | |
| Bot. 105 | 3(1-4, 2)or |
| General Microbiology | |
| Bact. 101 | 3(1-6)if General Botany I is chosen the first semester. |
| Industrial Writing | |
| Ind. Jour. 157 | 2(2-0) |
| Journalism Practice II | |
| Ind. Jour. 160 | 2(0-6) |
| French II | |
| Mod. Lang. 152..... | 3(3-0)or |
| Spanish II | |
| Mod. Lang. 177..... | 3(3-0) |
| Options* | 3(-) |
| Industrial Journalism Lectures... | R |
| Military Science A-IV (Men) | |
| Mil. Tr. 104 | 1(0-4) |
| Physical Education M-IV (Men) | |
| Phys. Ed. 106 | R(0-2)or |
| Physical Training W-IV (Women) | |
| Phys. Ed. 154 | 1(0-3) |

* The options and electives are chosen with the advice and approval of the dean. The options are in two general groups, of eighteen semester credits each: (1) social science, and (2) courses related to an industry or applied science. In the tabulated presentation of electives for students in the Division of General Science, groups may be found that will be accepted as the required option and electives. Group 31 (applied science), group 32 (home economics), group 35 (agriculture), group 36 (architecture), or group 37 (manual training), may be chosen in satisfaction of the eighteen hours required related to an industry or applied science. From group 30, eighteen hours are to be chosen in satisfaction of the social science option. The options taken in the freshman year, and a large part of those in the sophomore year, must be those related to an industry or applied science.

The electives are to be chosen in groups of usually not fewer than eight semester credits, unless they are courses which extend fields already entered through the required subjects or the options.

JUNIOR

FIRST SEMESTER

| | |
|------------------------------------|---------|
| Industrial Feature Writing I | |
| Ind. Jour. 167 | 2(2-0) |
| Journalism Practice III | |
| Ind. Jour. 175 | 2(0-6) |
| Extempore Speech I | |
| Pub. Spk. 106 | 2(2-0) |
| Options and Electives* | 10(-) |
| Industrial Journalism Lectures ... | R |

SECOND SEMESTER

| | |
|------------------------------------|--------|
| Industrial Feature Writing II | |
| Ind. Jour. 171 | 2(2-0) |
| Journalism Practice IV | |
| Ind. Jour. 183 | 2(0-6) |
| Principles of Advertising | |
| Ind. Jour. 179 | 3(3-0) |
| Options and Electives* | 9(-) |
| Industrial Journalism Lectures ... | R |

SENIOR

FIRST SEMESTER

| | |
|---------------------------------------|---------|
| Circulation and Advertising Promotion | |
| Ind. Jour. 251 | 3(3-0) |
| Copy Reading | |
| Ind. Jour. 254 | 2(0-6) |
| Electives and Options* | 11(-) |
| Industrial Journalism Lectures ... | R |

SECOND SEMESTER

| | |
|------------------------------------|---------|
| Editorial Practice | |
| Ind. Jour. 257 | 2(2-0) |
| Ethics of Journalism | |
| Ind. Jour. 260 | 2(2-0) |
| Electives and Options* | 11(-) |
| Industrial Journalism Lectures ... | R |

Curriculum in Agricultural Chemistry

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER

| | |
|----------------------------|-----------|
| College Rhetoric I | |
| Engl. 101 | 3(0-3) |
| Chemistry I | |
| Chem. 101 | 5(3-6) |
| Plane Trigonometry* | |
| Math. 101 | 3(3-0) |
| General Zoölogy I | |
| Zoöl. 101 | 3(2-3) |
| Engineering Drawing | |
| Ap. Mech. 155 | 2(0-6) |
| Library Methods | |
| Lib. Ec. 101 | 1(1-0) |
| Military Science A-I (Men) | |
| Mil. Tr. 101 | 1(0-4) |
| Physical Education M-I | |
| Phys. Ed. 103 | R(0-2) or |
| Physical Education W-I | |
| Phys. Ed. 151A | 1(0-3) |

SECOND SEMESTER

| | |
|-----------------------------|-----------|
| College Rhetoric II | |
| Engl. 104 | 3(3-0) |
| Chemistry II | |
| Chem. 102 | 5(3-6) |
| College Algebra* | |
| Math. 104 | 3(3-0) |
| General Zoölogy II | |
| Zoöl. 102 | 3(2-3) |
| General Botany I | |
| Bot. 101 | 3(1-4, 2) |
| Military Science A-II (Men) | |
| Mil. Tr. 102 | 1(0-4) |
| Physical Education M-II | |
| Phys. Ed. 104 | R(0-2) or |
| Physical Education W-II | |
| Phys. Ed. 152A | 1(0-3) |

* See footnote on the previous page.

SOPHOMORE

FIRST SEMESTER

| | |
|----------------------------------|-----------|
| Organic Chemistry I | |
| Chem. 218 | 4(2-6) |
| Plane Analytical Geometry | |
| Math. 110 | 4(4-0) |
| Engineering Physics I | |
| Physics 145 | 5(4-3) |
| General Botany II | |
| Bot. 105 | 3(1-4, 2) |
| Business Law I | |
| Hist. 163 | 1(1-0) |
| Military Science A-III (Men) | |
| Mil. Tr. 103 | 1(0-4) |
| Physical Education M-III (Men) | |
| Phys. Ed. 105 | R(0-2) or |
| Physical Education W-III (Women) | |
| Phys. Ed. 153 | 1(0-3) |

SECOND SEMESTER

| | |
|---------------------------------|-----------|
| Organic Chemistry II | |
| Chem. 219 | 4(2-6) |
| Calculus | |
| Math. 119 | 3(3-0) |
| Engineering Physics II | |
| Phys. 150 | 5(4-3) |
| Quantitative Analysis | |
| Chem. 241 | 5(1-12) |
| Military Science A-IV (Men) | |
| Mil. Tr. 104 | 1(0-4) |
| Physical Education M-IV (Men) | |
| Phys. Ed. 106 | R(0-2) or |
| Physical Education W-IV (Women) | |
| Phys. Ed. 154 | 1(0-3) |

JUNIOR

FIRST SEMESTER

| | |
|---------------------------|--------|
| German I | |
| Mod. Lang. 101 | 3(3-0) |
| Inorganic Preparations | |
| Chem. 202 | 2(0-6) |
| Physical Chemistry | |
| Chem. 206 | 5(3-6) |
| Agricultural Microbiology | |
| Bact. 106 | 3(1-6) |
| Soils | |
| Agron. 131 | 4(3-3) |

SECOND SEMESTER

| | |
|----------------------|--------|
| German II | |
| Mod. Lang. 102 | 3(3-0) |
| History of Chemistry | |
| Chem. 208 | 1(1-0) |
| Food Analysis | |
| Chem. 257 | 3(0-9) |
| Soil Fertility | |
| Agron. 132 | 3(2-3) |
| American Government | |
| Hist. 151 | 3(3-0) |
| Elective † | 3(-) |

SENIOR

FIRST SEMESTER

| | |
|--------------------------------|--------|
| Comparative Physiology I | |
| Anat. 121 | 5(4-3) |
| Chem. of Soils and Fertilizers | |
| Chem. 252 | 3(1-6) |
| Scientific German I | |
| Mod. Lang. 237 | 4(4-0) |
| Electives † | 4(-) |
| Thesis | R |

SECOND SEMESTER

| | |
|--------------------|---------|
| Economics | |
| Econ. 101 | 3(3-0) |
| Chemistry of Crops | |
| Chem. 253 | 3(1-6) |
| Electives † | 10(-) |
| Thesis | R |

* Students who offer but one unit of algebra for admission take a five-credit course in College Algebra, Math. 107, the first semester, postponing trigonometry, current history, and library methods until the second semester. The additional credits are applied against electives.

† Electives are to be chosen, with the advice and approval of the dean, in groups of not less than eight semester credits, or in courses which extend fields already entered in the required work.

Curriculum in Biochemistry

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

| FIRST SEMESTER | | SECOND SEMESTER | |
|----------------------------|------------------|-----------------------------|------------------|
| College Rhetoric I | | College Rhetoric II | |
| Engl. 101 | 3(3-0) | Engl. 104 | 3(3-0) |
| Chemistry I | | Chemistry II | |
| Chem. 101 | 5(3-6) | Chem. 102 | 5(3-6) |
| Plane Trigonometry* | | College Algebra* | |
| Math. 101 | 3(3-0) | Math. 104 | 3(3-0) |
| General Zoölogy I | | General Zoölogy II | |
| Zoöl. 101 | 3(2-3) | Zoöl. 102 | 3(2-3) |
| Engineering Drawing | | General Botany I | |
| Ap. Mech. 155 | 2(0-6) | Bot. 101 | 3(1-4, 2) |
| Library Methods | | | |
| Lib. Ec. 101 | 1(1-0) | | |
| Military Science A-I (Men) | | Military Science A-II (Men) | |
| Mil. Tr. 101 | 1(0-4) | Mil. Tr. 102 | 1(0-4) |
| Physical Education M-I | | Physical Education M-II | |
| Phys. Ed. 103 | R(0-2) <i>or</i> | Phys. Ed. 104 | R(0-2) <i>or</i> |
| Physical Education W-I | | Physical Education W-II | |
| Phys. Ed. 151A | 1(0-3) | Phys. Ed. 152A | 1(0-3) |

SOPHOMORE

| FIRST SEMESTER | | SECOND SEMESTER | |
|----------------------------------|------------------|---------------------------------|------------------|
| Organic Chemistry I | | Organic Chemistry II | |
| Chem. 218 | 4(2-6) | Chem. 219 | 4(2-6) |
| Plane Analytical Geometry | | Calculus | |
| Math. 110 | 4(4-0) | Math. 119 | 3(3-0) |
| Engineering Physics I | | Engineering Physics II | |
| Physics 145 | 5(4-3) | Physics 150 | 5(4-3) |
| General Botany II | | Quantitative Analysis | |
| Bot. 105 | 3(1-4, 2) | Chem. 241 | 5(1-12) |
| Business Law I | | | |
| Hist. 163 | 1(1-0) | | |
| Military Science A-III (Men) | | Military Science A-IV (Men) | |
| Mil. Tr. 103 | 1(0-4) | Mil. Tr. 104 | 1(0-4) |
| Physical Education M-III (Men) | | Physical Education M-IV (Men) | |
| Phys. Ed. 105 | R(0-2) <i>or</i> | Phys. Ed. 106 | R(0-2) <i>or</i> |
| Physical Education W-III (Women) | | Physical Education W-IV (Women) | |
| Phys. Ed. 153 | 1(0-3) | Phys. Ed. 154 | 1(0-3) |

JUNIOR

| FIRST SEMESTER | | SECOND SEMESTER | |
|--------------------------|--------|----------------------|--------|
| German I | | German II | |
| Mod. Lang. 101 | 3(3-0) | Mod. Lang. 102 | 3(3-0) |
| Inorganic Preparations | | History of Chemistry | |
| Chem. 202 | 2(0-6) | Chem. 208 | 1(1-0) |
| Physical Chemistry | | General Microbiology | |
| Chem. 206 | 5(3-6) | Bact. 101 | 3(1-6) |
| Histology I | | American Government | |
| Path. 101 | 3(1-6) | Hist. 151 | 3(3-0) |
| Comparative Physiology I | | Elective † | 3(-) |
| Anat. 121 | 5(4-3) | | |

* Students who offer but one unit of algebra for admission take a five-credit course in College Algebra, Math. 107, the first semester, postponing trigonometry, current history, and library methods until the second semester. The additional credits are applied against electives.

† Electives are to be chosen, with the advice and approval of the dean, in groups of not less than eight semester credits, or in courses which extend fields already entered in the required work.

SENIOR

FIRST SEMESTER

| | |
|---------------------------|---------|
| Physiological Chemistry I | |
| Chem. 232 | 5(3-6) |
| Organic Preparations | |
| Chem. 223 | 5(0-15) |
| Economics | |
| Econ. 101 | 3(3-0) |
| Scientific German I | |
| Mod. Lang. 237 | 4(4-0) |
| Thesis | R |

SECOND SEMESTER

| | |
|----------------------------|---------|
| Physiological Chemistry II | |
| Chem. 233 | 5(3-6) |
| Biochemical Preparations | |
| Chem. 234 | 5(0-15) |
| Pathogenic Bacteriology I | |
| Bact. 111 | 4(2-6) |
| Elective † | 3(-) |
| Thesis | R |

Curriculum in Industrial Chemistry

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER

| | |
|----------------------------|----------|
| College Rhetoric I | |
| Engl. 101 | 3(3-0) |
| Chemistry I | |
| Chem. 101 | 5(3-6) |
| Plane Trigonometry* | |
| Math. 101 | 3(3-0) |
| Engineering Drawing | |
| Ap. Mech. 155 | 2(0-6) |
| Library Methods | |
| Lib. Ec. 101 | 1(1-0) |
| Woodwork | |
| Shop 101 | 1(0-3) |
| Forging I | |
| Shop 150 | 1(0-3) |
| Military Science A-I (Men) | |
| Mil. Tr. 101 | 1(0-4) |
| Physical Education M-I | |
| Phys. Ed. 103 | R(0-2)or |
| Physical Education W-I | |
| Phys. Ed. 151A | 1(0-3) |

SECOND SEMESTER

| | |
|-----------------------------|----------|
| College Rhetoric II | |
| Engl. 104 | 3(3-0) |
| Chemistry II | |
| Chem. 102 | 5(3-6) |
| College Algebra* | |
| Math. 104 | 3(3-0) |
| Descriptive Geometry | |
| Ap. Mech. 158 | 2(0-6) |
| Mechanical Drawing I | |
| Ap. Mech. 161 | 2(0-6) |
| Business Law I | |
| Hist. 163 | 1(1-0) |
| Military Science A-II (Men) | |
| Mil. Tr. 102 | 1(0-4) |
| Physical Education M-II | |
| Phys. Ed. 104 | R(0-2)or |
| Physical Education W-II | |
| Phys. Ed. 152A | 1(0-3) |

SOPHOMORE

FIRST SEMESTER

| | |
|----------------------------------|----------|
| Organic Chemistry I | |
| Chem. 218 | 4(2-6) |
| Plane Analytical Geometry | |
| Math. 110 | 4(4-0) |
| Engineering Physics I | |
| Physics 145 | 5(4-3) |
| Adv. Inorg. Chemistry | |
| Chem. 207 | 3(3-0) |
| Military Science A-III (Men) | |
| Mil. Tr. 103 | 1(0-4) |
| Physical Education M-III (Men) | |
| Phys. Ed. 105 | R(0-2)or |
| Physical Education W-III (Women) | |
| Phys. Ed. 153 | 1(0-3) |

SECOND SEMESTER

| | |
|---------------------------------|----------|
| Organic Chemistry II | |
| Chem. 219 | 4(2-6) |
| Calculus | |
| Math. 119 | 3(3-0) |
| Engineering Physics II | |
| Physics 150 | 5(4-3) |
| Quantitative Analysis | |
| Chem. 241 | 5(1-12) |
| Military Science A-IV (Men) | |
| Mil. Tr. 104 | 1(0-4) |
| Physical Education M-IV (Men) | |
| Phys. Ed. 106 | R(0-2)or |
| Physical Education W-IV (Women) | |
| Phys. Ed. 154 | 1(0-3) |

* Students who offer but one unit of algebra for admission take a five-credit course in College Algebra, Math. 107, the first semester, postponing trigonometry, current history, and library methods until the second semester. The additional credits are applied against electives.

† Electives are to be chosen, with the advice and approval of the dean, in groups of not less than eight semester credits, or in courses which extend fields already entered in the required work.

JUNIOR

| FIRST SEMESTER | |
|------------------------|--------|
| German I | |
| Mod. Lang. 101 | 3(3-0) |
| Inorganic Preparations | |
| Chem. 202 | 2(0-6) |
| Physical Chemistry | |
| Chem. 206 | 5(3-6) |
| Fire Assaying | |
| Chem. 242 | 2(0-6) |
| Gas Analysis | |
| Chem. 243 | 1(0-3) |
| Elective † | 3(-) |

| SECOND SEMESTER | |
|-----------------------------|-----------|
| German II | |
| Mod. Lang. 102 | 3(3-0) |
| History of Chemistry | |
| Chem. 208 | 1(1-0) |
| Industrial Electrochemistry | |
| Chem. 205 | 2(2-0) |
| Electrical Engineering C | |
| Elect. Engr. 160, 165... | 3(2-2, 1) |
| Elective † | 7(-) |

SENIOR

| FIRST SEMESTER | |
|------------------------|--------|
| American Government | |
| Hist. 151 | 3(3-0) |
| Industrial Chemistry I | |
| Chem. 203 | 5(3-6) |
| Scientific German I | |
| Mod. Lang. 237 | 4(4-0) |
| Electives † | 4(-) |
| Thesis | R |

| SECOND SEMESTER | |
|-------------------------|--------|
| Economics | |
| Econ. 101 | 3(3-0) |
| Industrial Chemistry II | |
| Chem. 204 | 5(3-6) |
| Electives † | 8(-) |
| Thesis | R |

Groups of Electives and Options for Students in the Division of General Science

In addition to the courses included in the following groups, others will be found described in the exposition of the work of the respective departments. From any group elected a sufficient number of courses to constitute an effective block of knowledge must be taken. At least eight semester credits in any new field are usually required, but a smaller number will be honored if in a field already entered upon. In a modern language a student must reach a point equivalent to that obtained by college courses aggregating eight or nine semester hours.

1. English Language

| FIRST SEMESTER | |
|--------------------------|--------|
| Advanced Composition I | |
| Engl. 113 | 2(2-0) |
| Business English | |
| Engl. 122 | 3(3-0) |
| Oral English I | |
| Engl. 128 | 3(3-0) |
| Argumentation and Debate | |
| Engl. 119 | 3(3-0) |
| The Short Story | |
| Engl. 251 | 3(3-0) |

| SECOND SEMESTER | |
|-----------------------------|--------|
| Advanced Composition II | |
| Engl. 116 | 2(2-0) |
| Advertising English | |
| Engl. 125 | 3(3-0) |
| Oral English II | |
| Engl. 131 | 3(3-0) |
| Methods of Teaching English | |
| Engl. 134 | 3(3-0) |
| Community English | |
| Engl. 254 | 2(2-0) |

† Electives are to be chosen, with the advice and approval of the dean, in groups of not less than eight semester credits, or in courses which extend fields already entered in the required work.

2. English Literature

| | | | |
|--|--------|---|--------|
| The English Bible I Engl. 271 | 3(3-0) | The Shakspearean Drama Engl. 274 | 3(3-0) |
| Nineteenth Century Literature Engl. 277 | 3(3-0) | American Literature Engl. 280 | 3(3-0) |
| Current Literature Engl. 282 | 2(2-0) | The Novel I Engl. 286 | 3(3-0) |
| English Survey I Engl. 288 | 2(2-0) | English Survey II Engl. 290 | 2(2-0) |
| Browning Engl. 292A | 3(3-0) | The Arts and Crafts Movement Engl. 295 | 2(2-0) |

3. German

| | | | |
|--|--------|---|--------|
| German I Mod. Lang. 101..... | 3(3-0) | German II Mod. Lang. 102..... | 3(3-0) |
| German Readings Mod. Lang. 111..... | 3(3-0) | German Short Stories Mod. Lang. 201..... | 3(3-0) |
| Scientific German I Mod. Lang. 237..... | 4(4-0) | Scientific German II Mod. Lang. 241..... | 3(3-0) |

4. French and Spanish

| | | | |
|---|--------|---|--------|
| French I Mod. Lang. 151..... | 3(3-0) | French II Mod. Lang. 152..... | 3(3-0) |
| French Readings Mod. Lang. 161..... | 3(3-0) | French Short Stories Mod. Lang. 251..... | 3(3-0) |
| Spanish I Mod. Lang. 176..... | 3(3-0) | Spanish II Mod. Lang. 177..... | 3(3-0) |
| Spanish Readings Mod. Lang. 180..... | 3(3-0) | Commercial Spanish Mod. Lang. 183..... | 3(3-0) |

5. Mathematics

| | | | |
|--|--------|--|--------|
| Plane Analytical Geometry Math. 110 | 4(4-0) | Calculus Math. 119 | 3(3-0) |
| Calculus I Math. 113 | 5(5-0) | Calculus II Math. 116 | 3(3-0) |
| Analysis of Statistics Math. 125 | 3(3-0) | Institutional Accounting Math. 131 | 3(3-0) |
| Differential Equations Math. 201 | 3(3-0) | Special Methods in the Teaching of Mathematics Math. 122 | 3(3-0) |

6. Inorganic Chemistry

| FIRST SEMESTER | | SECOND SEMESTER | |
|---|-------------------|--|--------|
| Advanced Inorganic Chemistry Chem. 207 | 3(3-0) | Industrial Electrochemistry Chem. 205 | 2(2-0) |
| Inorganic Preparations Chem. 202 | 2(0-6) to 4(0-12) | Physical Chemistry Chem. 206 | 5(3-6) |
| Industrial Chemistry I Chem. 203 | 5(3-6) | Industrial Chemistry II Chem. 204 | 5(3-6) |

7. Organic Chemistry

| | | | |
|--|---------|---|--------|
| Organic Chemistry Chem. 120 | 3(2-3) | Organic Chemistry HE Chem. 121 | 5(3-6) |
| Organic Chemistry I Chem. 218 | 4(2-6) | Organic Chemistry II Chem. 219 | 4(2-6) |
| Organic Preparations Chem. 223 | 5(0-15) | Stereoisomeric and Tautomeric Compounds Chem. 225 | 2(2-0) |
| Qualitative Org. Analysis Chem. 224 | 2(0-6) | Carbocyclic and Heterocyclic Compounds Chem. 226 | 2(2-0) |
| Physiological Chemistry I Chem. 232 | 5(3-6) | Physiological Chemistry II Chem. 233 | 5(3-6) |
| Pathological Chemistry Chem. 235 | 2(2-0) | Physiological Chemistry Chem. 231 | 5(3-6) |

8. Analytical Chemistry

| | | | |
|-------------------------------|--------|---------------------------|--------|
| Quantitative Analysis I | | Quantitative Analysis I | |
| Chem. 150 | 2(0-6) | Chem. 150 | 2(0-6) |
| Quantitative Analysis II | | Quantitative Analysis III | |
| Chem. 250 | 3(1-6) | Chem. 251 | 3(1-6) |
| Advanced Qualitative Analysis | | Household Chemistry | |
| Chem. 240 | 3(1-6) | Chem. 265 | 3(1-6) |

9. Physics

| | | | |
|---------------------|--------|-----------------------------------|--------|
| Household Physics | | Agricultural Physics | |
| Physics 101 | 4(3-3) | Physics 111 | 3(3-0) |
| Photography | | Harmonics | |
| Physics 120 | 2(1-3) | Physics 222 | 2(2-0) |
| Molecular Physics | | Physical Measurements | |
| Physics 221 | 4(3-3) | Physics 223 | 3(2-3) |
| Wireless Telegraphy | | Special Methods in the Teaching | |
| Physics 130 | 2(1-3) | of Physics | |
| Spectroscopy | | Physics 224 | 3(2-3) |
| Physics 230 | 3(1-6) | Radioactivity and Electron Theory | |
| | | Physics 233 | 3(3-0) |

10. Microbiology

| | | | |
|----------------------------|--------|-------------------------------|--------|
| Agricultural Microbiology | | Soil Microbiology | |
| Bact. 106 | 3(1-6) | Bact. 201 | 3(1-6) |
| Hygienic Bacteriology | | Pathogenic Bacteriology I | |
| Bact. 206 | 4(2-6) | Bact. 111 | 4(2-6) |
| Pathogenic Bacteriology II | | Dairy Bacteriology | |
| Bact. 116 | 4(2-6) | Bact. 211 | 3(1-6) |
| Poultry Bacteriology | | Water Purification and Sewage | |
| Bact. 216 | 3(1-6) | Disposal | |
| | | Bact. 221 | 3(1-6) |

11. Botany

| | | | |
|---------------------|-----------|---------------------------|-----------|
| Plant Pathology I | | Plant Histology | |
| Bot. 116 | 3(1-4, 2) | Bot. 215 | 2(0-6) |
| Plant Pathology II | | Ecology | |
| Bot. 201 | 3(1-4, 2) | Bot. 228 | 2(2-0) |
| Plant Physiology I | | Taxonomic Botany of the | |
| Bot. 208 | 3(3-0) | Flowering Plants | |
| Evolution of Plants | | Bot. 225 | 3(1-4, 2) |
| Bot. 222 | 3(3-0) | Field Crops and Vegetable | |
| | | Diseases | |
| | | Bot. 203 | 2(1-2, 1) |
| | | Fruit Crop Diseases | |
| | | Bot. 202 | 2(1-2, 1) |

12. Zoology

| FIRST SEMESTER | | SECOND SEMESTER | |
|-------------------------------|--------|-------------------------------|--------|
| Advanced Invertebrate Zoölogy | | Advanced Vertebrate Zoölogy | |
| Zoöl. 201 | 4(2-6) | Zoöl. 202 | 4(2-6) |
| Taxonomy of Invertebrates | | Taxonomy of Vertebrates | |
| Zoöl. 205 | 3(0-9) | Zoöl. 208 | 3(0-9) |
| Parasitology | | Animal Ecology | |
| Zoöl. 214 | 4(2-6) | Zoöl. 211 | 3(1-6) |
| Parasitology | | Economic Zoölogy | |
| Zoöl. 123 | 2(1-3) | Zoöl. 126 | 3(1-6) |
| Embryology | | Advanced Mammalian Embryology | |
| Zoöl. 117 | 3(2-3) | Zoöl. 220 | 4(2-6) |

13. Geology

| | | | |
|--------------------------------|--------|---------------------|--------|
| Dynamic and Structural Geology | | Historical Geology | |
| Geol. 101 | 2(2-0) | Geol. 201 | 2(2-0) |
| | | Engineering Geology | |
| | | Geol. 102 | 4(2-6) |

14. Entomology

| | | | |
|-----------------------------|--------|-----------------------------|--------|
| General Entomology | | General Economic Entomology | |
| Ent. 101 | 3(2-3) | Ent. 206 | 3(2-3) |
| Insect Morphology I | | Apiculture | |
| Ent. 211 | 3(1-6) | Ent. 111 | 3(2-3) |
| Advanced General Entomology | | Principles of Taxonomy | |
| Ent. 221 | 3(3-0) | Ent. 216 | 1(1-0) |
| Advanced Apiculture | | Taxonomy of Insects I | |
| Ent. 228 | 3(2-3) | Ent. 217 | 2(0-6) |

15. History and Civics

| | | | |
|---------------------------------------|--------|---|--------|
| American History II | | American History III | |
| Hist. 202 | 3(3-0) | Hist. 203 | 3(3-0) |
| American Industrial History | | | |
| Hist. 105 | 3(3-0) | | |
| Pan-America | | Immigration and International Relations | |
| Hist. 207 | 2(2-0) | Hist. 228 | 2(2-0) |
| Modern England and the British Empire | | Comparative Government | |
| Hist. 226A | 2(2-0) | Hist. 252 | 2(2-0) |
| American Political History | | History of the Home | |
| Hist. 206 | 2(2-0) | Hist. 225 | 3(3-0) |

16. Law

| | | | |
|-----------------|--------|-----------------|--------|
| Business Law I | | Business Law II | |
| Hist. 153 | 1(1-0) | Hist. 154 | 1(1-0) |
| | | Farm Law | |
| | | Hist. 155 | 2(2-0) |

17. Economics and Sociology

| | | | |
|-----------------------|--------|-----------------------------|--------|
| Economics | | Agricultural Economics | |
| Econ. 101 | 3(3-0) | Ag. Ec. 101 | 3(3-0) |
| Sociology | | Marketing and Farm Products | |
| Econ. 151 | 3(3-0) | Ag. Ec. 201 | 3(3-0) |
| Business Organization | | Money and Banking | |
| Econ. 106 | 1(1-0) | Econ. 116 | 2(2-0) |
| Labor Problems | | Public Finance | |
| Econ. 111 | 2(2-0) | Econ. 213 | 2(2-0) |

18. Education

| | | | |
|------------------------------|--------|--------------------------|--------|
| Educational Administration A | | Educational Psychology | |
| Educ. 105 | 3(3-0) | Educ. 109 | 3(3-0) |
| History of Education A | | Educational Sociology A | |
| Educ. 113 | 3(3-0) | Educ. 118 | 3(3-0) |
| Rural Education | | Educational Measurements | |
| Educ. 201 | 3(3-0) | Educ. 211 | 3(3-0) |

19. Vocational Education

| FIRST SEMESTER | | SECOND SEMESTER | |
|--------------------------|--------|---|--------|
| Agricultural Education | | Special Methods in the Teaching of Agriculture | |
| Educ. 126 | 3(3-0) | Educ. 136 | 3(3-0) |
| | | Supervised Observation and Teaching in Agriculture | |
| | | Educ. 161 | 3(0-9) |
| Home Economics Education | | Special Methods in the Teaching of Home Economics | |
| Educ. 122 | 3(3-0) | Educ. 132 | 3(3-0) |
| | | Supervised Observation and Teaching in Home Economics | |
| | | Educ. 160 | 3(0-9) |
| Industrial Education | | Special Methods in the Teaching of Industrial Arts Subjects | |
| Educ. 130 | 3(3-0) | Educ. 140 | 3(3-0) |
| | | Supervised Observation and Teaching in Industrial Arts | |
| | | Educ. 162 | 3(0-9) |

20. Industrial Journalism

| | | | |
|------------------------------|--------|-------------------------------|--------|
| Elementary Journalism | | Industrial Writing | |
| Ind. Jour. 151..... | 2(2-0) | Ind. Jour. 157..... | 2(2-0) |
| Journalism Practice I | | Journalism Practice II | |
| Ind. Jour. 154..... | 2(0-6) | Ind. Jour. 160..... | 2(0-6) |
| Industrial Feature Writing I | | Industrial Feature Writing II | |
| Ind. Jour. 167..... | 2(2-0) | Ind. Jour. 171..... | 2(2-0) |
| Journalism Practice III | | Journalism Practice IV | |
| Ind. Jour. 175..... | 2(0-6) | Ind. Jour. 183..... | 2(0-6) |
| Materials of Journalism | | Magazine Features | |
| Ind. Jour. 265..... | 2(2-0) | Ind. Jour. 270..... | 2(-) |
| History of Journalism | | Journalism Surveys | |
| Ind. Jour. 274..... | 2(2-0) | Ind. Jour. 278..... | 2(0-6) |

23. Music

Voice (Music 130)

Two private lessons a week. Two semester credits.

Piano (Music 140)

Two private lessons a week. Two semester credits.

Violin (Music 135)

Two private lessons a week. Two semester credits.

Wind Instruments (Music 145)

Two private lessons a week. Two semester credits.

| | | | |
|--------------------------|--------|-----------------------------------|--------|
| Harmony I | | Harmony II | |
| Music 101 | 2(2-0) | Music 102 | 2(2-0) |
| Harmony III | | Harmony IV | |
| Music 103 | 2(2-0) | Music 104 | 2(2-0) |
| Counterpoint | | Musical Form and Musical Analysis | |
| Music 107 | 2(2-0) | Music 109 | 2(2-0) |
| History of Music I | | History of Music II | |
| Music 110 | 2(2-0) | Music 111 | 2(2-0) |
| School Music Methods I | | School Music Methods II | |
| Music 120 | 2(-) | Music 121 | 2(-) |
| School Music Methods III | | School Music Methods IV | |
| Music 122 | 2(-) | Music 123 | 2(-) |
| Choral Society | | Choral Society | |
| Music 150 | 1(1-0) | Music 150 | 1(1-0) |
| Orchestra | | Orchestra | |
| Music 151 | 1(1-0) | Music 151 | 1(1-0) |
| College Band | | College Band | |
| Music 152 | 1(1-0) | Music 152 | 1(1-0) |

24. Rural Leadership

(a) For all; (b) for those preparing for work in agricultural extension; (c) for adult special students; (d) for those preparing for home economics extension.

| | | | |
|-----------------------------|--------|-------------------------------------|--------|
| (a) Rural Sociology | | (a) Rural Organization | |
| Econ. 156 | 3(3-0) | Econ. 264 | 2(2-0) |
| (a) Agricultural Economics | | (a) Rural Leadership | |
| Ag. Ec. 101..... | 3(3-0) | Econ. 261 | 1(1-0) |
| (a) Rural Education | | (b, c) Marketing of Farm Products | |
| Educ. 201 | 3(3-0) | Ag. Ec. 202 | 3(3-0) |
| | | (b, c) Agricultural Industries | |
| | | Ag. Ec. 211 | 2(2-0) |
| (c) Farm Advertising | | (c) Farm Bulletins | |
| Engl. 201 | 3(3-0) | Econ. 204 | 2(2-0) |
| (c) Agricultural Journalism | | (c) Adv. Public Speaking | |
| Ind. Jour. 164 | 1(1-0) | Pub. Spk. 110..... | 1(1-0) |
| (c, d) Social Problems | | (c, d) Sanitation and Public Health | |
| Econ. 257 | 2(2-0) | Hshld. Ec. 211..... | 3(3-0) |
| (d) Child Welfare | | (d) Home Nursing | |
| Hshld. Ec. 203..... | 3(3-0) | Hshld. Ec. 109..... | 3(3-0) |

30. Social Science

FIRST SEMESTER

| | |
|-----------------------|--------|
| American History I | |
| Hist. 101 | 3(3-0) |
| American Government | |
| Hist. 151 | 3(3-0) |
| Pan-America | |
| Hist. 207 | 2(2-0) |
| English History | |
| Hist. 121 | 3(3-0) |
| Economics | |
| Econ. 101 | 3(3-0) |
| Business Organization | |
| Econ. 106 | 1(1-0) |
| Labor Problems | |
| Econ. 111 | 2(2-0) |
| Sociology | |
| Econ. 151 | 3(3-0) |
| History of Journalism | |
| Ind. Jour. 274..... | 2(2-0) |

SECOND SEMESTER

| | |
|----------------------------|--------|
| American History II or III | |
| Hist. 202 or 203..... | 3(3-0) |
| Modern Europe | |
| Hist. 223 | 3(3-0) |
| Agricultural Economics | |
| Ag. Ec. 101..... | 3(3-0) |
| Money and Banking | |
| Econ. 116 | 2(2-0) |
| Public Finance | |
| Econ. 213 | 2(2-0) |
| Marketing of Farm Products | |
| Ag. Ec. 202..... | 2(2-0) |
| Agricultural Land Problems | |
| Ag. Ec. 217 | 2(2-0) |

31. Applied Science

| | |
|------------------|-----------|
| General Botany I | |
| Bot. 101 | 3(1-4, 2) |
| Plant Pathology | |
| Bot. 116 | 3(1-4, 2) |

| | |
|-----------------|--------|
| Farm Forestry | |
| Hort. 113 | 4(3-3) |

| | |
|---------------------------|--------|
| General Zoölogy I | |
| Zoöl. 101 | 3(2-3) |
| Parasitology | |
| Zoöl. 123 | 2(1-3) |
| Embryology and Physiology | |
| Zoöl. 108 | 5(3-6) |
| Hygiene Bacteriology | |
| Bact. 206 | 4(2-6) |

| | |
|--------------------------|--------|
| General Entomology | |
| Ent. 101 | 3(2-3) |
| Horticultural Entomology | |
| Ent. 201 | 2(2-0) |

| | |
|-------------------|--------|
| Organic Chemistry | |
| Chem. 120 | 3(2-3) |

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|-------------------------|--------|
| Quantitative Analysis I | |
| Chem. 150 | 2(0-6) |

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|------------------------------------|--------|
| Chemistry of Soils and Fertilizers | |
| Chem. 252 | 3(1-6) |

| | |
|--------------------|--------|
| Chemistry of Crops | |
| Chem. 253 | 3(1-6) |

| | |
|------------------------|--------|
| Human Nutrition | |
| Food and Nut. 112..... | 3(3-0) |

| | |
|-------------------|--------|
| Household Physics | |
| Physics 101 | 4(3-3) |

| | |
|-------------------|--------|
| Photography | |
| Physics 120 | 2(1-3) |

| | |
|-------------------|-----------|
| General Botany II | |
| Bot. 105 | 3(1-4, 2) |

| | |
|--------------------------------------|--------|
| Seed Identification and Weed Control | |
| Agron. 105 | 2(1-3) |

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|-------------------|-----------|
| Plant Propagation | |
| Hort. 101 | 3(2-2, 1) |

| | |
|-----------------|--------|
| Gardening | |
| Hort. 122 | 3(3-0) |

| | |
|-----------------------|--------|
| Landscape Gardening I | |
| Hort. 125 | 4(2-6) |

| | |
|--------------------|--------|
| General Zoölogy II | |
| Zoöl. 102 | 3(2-3) |

| | |
|------------------|--------|
| Economic Zoölogy | |
| Zoöl. 126 | 3(1-6) |

| | |
|----------------------|--------|
| General Microbiology | |
| Bact. 101 | 3(1-6) |

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| Water Purification and Sewage Disposal | |
| Bact. 221 | 3(1-6) |

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|-----------------------------|--------|
| General Economic Entomology | |
| Ent. 206 | 3(2-3) |

| | |
|----------------|--------|
| Apiculture | |
| Ent. 111 | 3(2-3) |

| | |
|-----------------|--------|
| Dairy Chemistry | |
| Chem. 254 | 3(1-6) |

| | |
|--------------------|--------|
| Chemistry of Meats | |
| Chem. 255 | 3(1-6) |

| | |
|---------------------|--------|
| Household Chemistry | |
| Chem. 265 | 3(1-6) |

| | |
|----------------------|--------|
| Agricultural Physics | |
| Physics 111 | 3(3-0) |

| | |
|---------------------|--------|
| Wireless Telegraphy | |
| Physics 130 | 2(1-3) |

32. Home Economics

| | | | | | | | | | |
|-------------------------|--------|--|--|--|-----------------------------|--------|--|--|--|
| Household Physics | | | | | Foods I | | | | |
| Physics 101 | 4(3-3) | | | | Food and Nut. 101..... | 3(1-6) | | | |
| Organic Chemistry HE | | | | | Household Microbiology | | | | |
| Chem. 121 | 5(3-6) | | | | Bact. 121 | 5(3-6) | | | |
| Foods II | | | | | Dietetics | | | | |
| Food and Nut. 106..... | 5(3-6) | | | | Food and Nut. 201..... | 5(3-6) | | | |
| Human Nutrition | | | | | | | | | |
| Food and Nut. 112..... | 3(3-0) | | | | | | | | |
| Design | | | | | Clothing I | | | | |
| Ap. Art. 101 | 3(1-6) | | | | Clo. and Text. 101..... | 2(1-3) | | | |
| Clothing II | | | | | Costume Design I | | | | |
| Clo. and Text. 111..... | 3(1-6) | | | | Clo. and Text. 106..... | 2(0-6) | | | |
| Interior Decoration and | | | | | Textiles | | | | |
| Furnishing | | | | | Clo. and Text. 116..... | 3(2-3) | | | |
| Ap. Art. 114..... | 3(1-6) | | | | | | | | |
| | | | | | Principles of Art and Their | | | | |
| | | | | | Application | | | | |
| | | | | | Ap. Art. 124 | 3(3-0) | | | |

35. Agriculture

| | | | | | | | | | |
|------------------------------|-----------|--|--|--|-------------------------|-----------|--|--|--|
| General Botany I | | | | | General Botany II | | | | |
| Bot. 101 | 3(1-4, 2) | | | | Bot. 105 | 3(1-4, 2) | | | |
| Market Grades and Classes of | | | | | Plant Propagation | | | | |
| Live Stock | | | | | Hort. 101 | 3(2-2, 1) | | | |
| An. Husb. 131 | 3(1-6) | | | | Forage Crop Production | | | | |
| Grain Crop Production | | | | | Agron. 102 | 3(2-2, 1) | | | |
| Agron. 101 | 3(2-2, 1) | | | | Dairy Judging | | | | |
| Elements of Dairying | | | | | Dairy Husb. 104..... | 1(0-3) | | | |
| Dairy Husb. 101..... | 3(2-3) | | | | Farm Poultry Production | | | | |
| Organic Chemistry | | | | | Poult. Husb. 101..... | 2(1-2, 1) | | | |
| Chem. 120 | 3(2-3) | | | | Principles of Feeding | | | | |
| Plant Pathology I | | | | | An. Husb. 152..... | 3(3-0) | | | |
| Bot. 116 | 3(1-4, 2) | | | | Orcharding | | | | |
| Soils | | | | | Hort. 107 | 2(1-2, 1) | | | |
| Agron. 131 | 4(3-3) | | | | Soil Fertility | | | | |
| Quantitative Analysis I | | | | | Agron. 132 | 3(2-2, 1) | | | |
| Chem. 150 | 2(0-6) | | | | | | | | |

36. Architecture

| | | | | | | | | | |
|-------------------------|--------|--|--|--|--------------------------|--------|--|--|--|
| Engineering Drawing | | | | | Descriptive Geometry | | | | |
| Ap. Mech. 155..... | 2(0-6) | | | | Ap. Mech. 158..... | 2(0-6) | | | |
| Architectural Drawing I | | | | | Architectural Drawing II | | | | |
| Arch. 108 | 2(0-6) | | | | Arch. 109 | 2(0-6) | | | |
| Free-hand Drawing I | | | | | Shades and Shadows | | | | |
| Arch. 111 | 2(0-6) | | | | Arch. 131 | 1(0-3) | | | |
| Design I | | | | | Free-hand Drawing II | | | | |
| Arch. 142 | 3(0-9) | | | | Arch. 114 | 2(0-6) | | | |
| | | | | | Design II | | | | |
| | | | | | Arch. 144 | 3(0-9) | | | |
| Perspective | | | | | | | | | |
| Arch. 128 | 1(0-3) | | | | | | | | |

37. Manual Training

| | | | |
|---|--------|--|--------|
| Wood Working for Grammar Grades Shop 120 | 2(0-6) | Wood Working I for High Schools Shop 125 | 2(0-6) |
| Wood Working II for High Schools Shop 130 | 2(0-6) | Wood Turning Shop 135 | 2(0-6) |
| Forging I Shop 150 | 1(0-3) | Forging II Shop 155 | 1(0-3) |
| Forging III Shop 186 | 1(0-3) | Forging IV Shop 189 | 1(0-3) |
| Foundry Practice Shop 160 | 1(0-3) | Pattern Making Shop 145 | 1(0-3) |
| Machine Tool Work I Shop 170 | 2(0-6) | Machine Tool Work II Shop 192 | 2(0-6) |
| Machine Tool Work III Shop 193 | 1(0-3) | Metallurgy Shop 165 | 2(2-0) |
| Farm Motors Farm Engr. 125, 126 ... | 3(2-3) | Rural Architecture Farm Engr. 102 | 3(0-9) |
| Concrete Construction Ap. Mech. 140, 145.... | 2(1-3) | Surveying I Civ. Engr. 102..... | 2(0-6) |
| Mechanical Drawing I Ap. Mech. 161..... | 2(0-6) | | |

45. Milling Industry

| | | | |
|--|-----------|--|--------|
| Organic Chemistry Chem. 250 | 3(1-6) | Quantitative Analysis III Chem. 251 | 3(1-6) |
| Quantitative Analysis II Chem. 120 | 3(2-3) | Principles of Milling Mill. Ind. 101..... | 1(0-3) |
| Grain Crop Production Agron. 101 | 3(2-2, 1) | Milling Practice I Mill. Ind. 109..... | 3(1-6) |
| Grain Marketing Mill. Ind. 102..... | 3(3-0) | Grain Products Mill. Ind. 103..... | 2(2-0) |
| Wheat and Flour Testing Mill. Ind. 203..... | 4(1-9) | Experimental Baking A Mill. Ind. 204..... | 2(0-6) |
| | | Milling Practice II Mill. Ind. 110..... | 2(0-6) |

Bacteriology

Professor BUSHNELL
Associate Professor HUNTER
Associate Professor GAINES

Instructor BEAUDETTE
Assistant BAKER

The Department of Bacteriology occupies parts of the first and second floors of Veterinary Hall. The space is divided into offices and private laboratories, an experiment station and research laboratory, a large general laboratory, incubator or temperature room, preparation room, and stock room. The laboratories are well lighted and equipped with gas, lockers, ice chests, sterilizers, wall cases, microscopes, and other modern facilities necessary for bacteriological work.

The instruction consists of lectures, recitations, demonstrations, and laboratory practice. Printed synopses of lectures and printed laboratory directions are furnished the students in some of the courses; in others textbooks are required. The department library contains textbooks on bacteriology and allied subjects, also the current files of the important technical periodicals relating to bacteriology. These are at the constant disposal of the students for reference. To those who desire graduate work the department offers excellent facilities.

Bacteriology is presented to the students as a biological science and as a practical factor in everyday life. In this subject only the simplest forms of life, consisting almost invariably of one-celled organisms, are studied. It is now possible to study these microscopical forms with ease and accuracy, thus paving the way for a more complete study and better understanding of cells in the aggregate. The second point of view from which this subject is approached is that of its practical application in agriculture, medicine, domestic science, and sanitation.

COURSES IN BACTERIOLOGY

FOR UNDERGRADUATES

101. GENERAL MICROBIOLOGY. Sophomore or junior year, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Professor Bushnell and Mr. Baker.

This general introductory course consists of lectures, recitations and demonstrations covering the morphological and biological characters, the classification and the distribution of bacteria, factors necessary for the development of bacteria, culture media, cultural features, staining values, and fundamental principles of applied bacteriology.

Laboratory.—The student prepares culture media and becomes familiar with principles of sterilization and incubation, and with general laboratory technic. During the last half of the semester, organisms representing the different families and genera are studied microscopically and culturally. Also preliminary quantitative and qualitative examinations are made of milk, water, soil, etc.

106. AGRICULTURAL MICROBIOLOGY. Junior year, both semesters. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry. Associate Professor Hunter and Mr. Baker.

This is a general course consisting of lectures, recitations and demonstrations. The relation of microorganisms to agriculture is particularly emphasized. First, information is given concerning the nature of microorganisms; their biological characteristics, classification and distribution in nature; their influence upon the plant food in the soil; their relation to certain fermentations, etc. Later some emphasis is placed upon the relation of microorganisms to disease; sources and modes of infection; use of germicidal agents and general hygienic measures.

Laboratory.—In the laboratory, the student becomes familiar with methods of cultivating and studying bacteria, yeasts and molds. Various known forms are studied; methods for the quantitative and qualitative analysis of water, milk, etc., are given some attention. Some time is given to methods of sterilization and the use of germicidal agents. The aim of this course is to give the student a general working knowledge of the subject and to point out its relation to agriculture and the problems of everyday life.

111. PATHOGENIC BACTERIOLOGY I. Sophomore year, second semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: Chemistry II. Doctor Beaudette.

This is primarily a general introductory course, consisting of lectures, demonstrations and recitations covering the distribution, the morphological and biochemical features of microorganisms; factors necessary for the development and cultivation of bacteria and the fundamental principles of the science as applied to veterinary medicine.

Laboratory.—The student first becomes acquainted with the general laboratory technic, comprising the preparation of media, methods of sterilization, incubation, inoculation, plating, isolating, and staining of bacteria. Different cultures of microorganisms are studied morpho-

logically, culturally and biochemically. Quantitative and qualitative examinations of milk and of water are made in the latter part of the semester.

116. PATHOGENIC BACTERIOLOGY II. Junior year, first semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: Pathogenic Bacteriology I. Doctor Beaudette.

A study is made of the morphology, powers of resistance, pathogenesis, distribution, channels of infection, and means of dissemination of pathogenic bacteria, especially those related to the specific infectious diseases of animals; epizootic and epidemic diseases of unknown etiology are further treated. A detailed study is made of the manufacture, standardization, preparation for the market and use of vaccines, antitoxins, and other biological products related to the diagnosis, prevention, and treatment of specific infectious diseases; of susceptibility, immunity, and infection; of theories of immunity; of anaphylaxis, opsonins, precipitins, bacteriolysins, and agglutinins.

Laboratory.—A study is made of the microscopical and cultural character of pathogenic microorganisms; of laboratory animal inoculations, autopsy, and diagnosis; prevention and treatment of specific infectious diseases. Experimental production of opsonins, antitoxins, agglutinins, precipitins, and cytolytins; experiments showing the constitutions and mode of action of these antibodies; production of active and passive anaphylaxis, and of anaphylatoxin; methods for the production and standardization of biological products, such as diphtheria and tetanus antitoxin, bacterins, etc.; the application of the various phenomena of immunity in the diagnosis of infectious diseases; the identification of animal and vegetable proteins; complement fixation tests for glanders, opsonic technic, etc., comprise the laboratory work.

121. HOUSEHOLD MICROBIOLOGY. Junior year, both semesters. Lectures, three hours; laboratory, six hours. Five semester credits. Prerequisite: Elementary Organic Chemistry. Professor Bushnell and Mr. Baker.

This course consists of lectures, recitations and demonstrations relating to the classification, distribution, and the relative importance of bacteria. The morphological and biochemical characters of microorganisms are considered, together with a study of those factors necessary for the proper development of bacteria, and the fundamental principles of the science as applied to household economics. It is designed to give the student a more thorough knowledge of those microorganisms which are of importance in the household. The significance of microbial findings in the analysis of water, milk, and foods, also consideration of the conditions which tend to increase or decrease the bacterial content of food substances, are studied in detail. Some time is given to the principles of sanitation as applied to public-health problems. The class work is a more theoretical consideration of the problems undertaken in the laboratory.

Laboratory.—General laboratory technic is first taken up consisting of preparation of media, methods and principles of sterilization, incubation, plating, isolating and staining of microorganisms. Studies consisting of the morphological, cultural, and biochemical characteristics of different organisms are made. A study of microorganisms and their activities, both beneficial and harmful, in their relation to household economy; bacteriological study of water, milk, and foods; the determination of the potability of water; milk contamination, the effect of cooling upon the bacterial content of milk, pasteurization of milk, etc.; microscopical study of yeasts and molds; the spoilage of canned vegetables and fruits; methods of food preservation; the manufacture of vinegar; study of activities of various species of microorganisms, thermal death point, the germicidal action of various disinfectants, etc., are topics taken up in the laboratory work.

FOR GRADUATES AND UNDERGRADUATES

201. SOIL MICROBIOLOGY. Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: Course 101 or 106. Associate Professor Gainey.

This is an introductory course covering the principles of soil microbiology as defined at the present time, and fitting the student for independent research on microbial investigations of soil, including the influence of microbial flora, of depth and character of soil, temperature, moisture, chemical reaction, aëration, and other factors; activities of soil microorganisms, ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation. Various texts are recommended as reference books.

Laboratory.—The laboratory work comprises the preparation of various special culture media and reagents necessary to conduct bacteriological analyses of the soil; qualitative analysis and the laboratory study of ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation; plot experiments and field work illustrating the influence of various factors upon the bacterial flora, and the inoculation of soil with symbiotic nitrogen-fixing bacteria.

206. HYGIENIC BACTERIOLOGY. Elective, first semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: General, Agricultural, or Household Microbiology. Professor Bushnell.

Pathogenic bacteria, especially those related to disease of man; channels of infection, and means of dissemination of pathogenic bacteria; epidemics, their cause and control; isolation, disinfection, and quarantine; prophylaxis against specific infectious diseases and important precautions necessary in the control of communicable diseases are studied. Various books are recommended as textbooks.

Laboratory.—The laboratory work comprises microscopical and cultural study of pathogenic bacteria; technic involved in the diagnosis of *Bacterium tuberculosis* in sputum; the culture of pathogenic anærobic bacteria; the isolation and identification of pathogenic bacteria from animal tissues, from pus and exudates; bacteriological examination of air, water, milk, sewage; interpretation of results, etc.

211. DAIRY BACTERIOLOGY. Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General, Agricultural, or Household Microbiology. Associate Professor Hunter.

Consideration is given to the bacterial flora of milk, butter, and cheese; to infectious diseases conveyed through dairy products; to bacterial contamination of milk by air, water, utensils, etc.; to normal and abnormal fermentations in milk, their significance and control.

Laboratory.—The preparation of culture media necessary for dairy bacteriological work; milk contamination; quantitative and qualitative bacteriological analyses of milk; the microscopical and cultural characters of the types of microorganisms representing the flora of milk, butter, and cheese; types of milk-fermenting organisms; the examination of cream, wash water, and separator slime; the effect of temperature on the growth of milk bacteria; pasteurization of milk; examination of milk for the presence of *Bacterium tuberculosis*, leucocytes and streptococci are taken up in the laboratory work. Various texts are recommended as reference books.

216. POULTRY BACTERIOLOGY. Elective, first semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General or Agricultural Microbiology. Doctor Beaudette.

Consideration is given to the various microbial diseases of poultry; etiology, sources, and modes of infection; prevention and cure; to the

microbial content of freshly-laid eggs, cold-storage eggs, and egg products, with conditions tending toward increase or decrease of this microbial content.

Laboratory.—Microorganisms pathogenic for poultry; artificial production, diagnosis, and control of poultry diseases; microbial content of eggs and egg preparations produced and handled under various conditions, form the subject matter of the laboratory work.

221. WATER PURIFICATION AND SEWAGE DISPOSAL. Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Microbiology, or Household Microbiology. Professor Bushnell.

The course comprises a study of the bacterial content of natural waters; of factors influencing the bacterial flora of water; of bacterial indicators of pollution; of the collection and transportation of water samples; of methods of water purification and sewage disposal; of the application of water sanitation to rural homes and municipalities.

Laboratory.—The laboratory work consists of quantitative and qualitative examinations, according to standard methods, of samples of water and sewage; methods involved in the enumeration and identification of intestinal bacteria in water; laboratory study of conditions influencing the bacterial content and potability of water. Printed laboratory directions are furnished.

226. BACTERIOLOGICAL PROBLEMS. Elective, both semesters and summer school. One to four semester credits. Prerequisites: Course 101, 106, 111, or 121. Professor Bushnell, Associate Professor Hunter, Associate Professor Gainey.

Students are assigned to special problems in the various phases of the subject. The credit obtained will depend upon the amount and quality of work done.

FOR GRADUATES

301. RESEARCH BACTERIOLOGY. Elective, both semesters. Credit to be arranged. Prerequisite: At least two of the outlined courses offered by the department. Professor Bushnell, Associate Professor Hunter, Associate Professor Gainey.

Advanced students showing sufficient training, ability and interest in original research are admitted to this course, upon approval of the head of the department. The student is under the direct supervision of a faculty member of the department, and in consultation with him the subject for investigation is chosen and outlined.

Students showing the proper interest and ability are given an opportunity to do experiment-station and advanced research work, during vacation periods, under the direct supervision of a faculty member of the department.

Students desiring to take work leading to an advanced degree are given individual research problems. After the proper completion of such an investigation, the results are presented to the graduate faculty in the form of a thesis. Such a thesis, when accepted by the faculty, fulfills part of the requirements for a Master of Science degree.

Botany and Plant Pathology

Professor MELCHERS
Professor MILLER
Associate Professor DAVIS
Assistant Professor GATES
Assistant Professor HAYMAKER

Instructor DALLEY
Assistant CASHEN
Assistant JOHNSTON

The instruction given in the Department of Botany and Plant Pathology has a threefold purpose:

First, general training in botany as an observational science, familiarizing the students with the meaning and relations of the manifold forms of plants and the principles governing their life processes. For those who wish to pursue the subject of botany professionally, opportunities are offered to secure a broad and thorough training in the courses given by the department.

Second, the importance of a scientific knowledge of the laws of plant life being fundamental in agriculture, it is sought in the elementary courses to provide such training as will generally fit the minds of agricultural students to grasp the underlying meaning of familiar field work with crops; such training, moreover, as may be built upon in a carefully graded series of advanced courses.

The third phase of the work of the Department of Botany and Plant Pathology lies in the investigation of those problems in plant life which affect agriculture. Three distinct general lines of work in botany are being conducted in the Experiment Station: Experimental investigations in the cause, prevention, and control of plant diseases; physiological investigations in drouth resistance in forage plants, and investigations and a survey of the Kansas flora.

The equipment for elementary instruction comprises eighty compound and sixty-four simple microscopes; a series of Jung, Peter, Kony, and Frank botanical charts; a lantern-slide projection apparatus; and a very complete collection of preserved material for studies in general morphology and plant pathology. For advanced work, Zeiss, Spencer, and Bausch and Lomb microscopes, with apochromatic lenses; a filar micrometer; Bausch and Lomb and Spencer camera lucidas; two Zeiss binocular microscopes; and Bausch and Lomb simple microscopes of the highest grade, provided with special camera lucida attachment, are furnished for the use of the members of the staff, and graduate students. A Minot precision microtome, two Spencer microtomes, electric and gas embedding and sterilizing ovens, and the usual supplies of reagents and glassware, are provided for histological studies.

For instruction in physiology a complete equipment of the Ganong and the Cambridge lines of physiological apparatus and supplies is available.

For investigations in plant pathology and plant physiology in the Experiment Station, a large laboratory is equipped with apparatus for studying normal and abnormal conditions in plants. The apparatus used for making determinations of fungus and bacterial diseases of plants, and for the study of the life histories of pathogenic organisms, consists in part as follows: three compound microscopes, a Bausch and Lomb binocular monobjective compound microscope, a Spencer binocular micro-

scope, analytical balances, drying ovens, hot-air sterilizers, steam autoclave, steam still, a Freas electric incubator, transfer chambers for isolating organisms, a Thelco low-temperature incubator, five Chicago electric incubators, pathological tables, research desks, a large supply of glassware for culturing, two soil and air thermographs, a very complete herbarium, containing the various genera and species of fungi, and a large and representative collection of preserved specimens, illustrating the economic plant diseases.

For general botanical reference there is an excellent herbarium, especially complete for the state of Kansas. A very good botanical library is available, containing the usual standard texts and reference works, and files of the principal foreign journals.

COURSES IN BOTANY

FOR UNDERGRADUATES

101. GENERAL BOTANY I: Freshman year, both semesters. Class work, one hour; laboratory, six hours.* Three semester credits. Professor Miller, Associate Professor Davis, Assistant Professors Gates and Haymaker, Miss Dalbey, and Miss Cashen.

This is a course of lectures, combined with special study of a required text, with reference reading. The principal life functions of plants, response of plants, such as photosynthesis, digestion, respiration, transpiration, and growth, and the responses of plants to environmental conditions and physical stimuli, are studied. The anatomy of the plant, in so far as it relates to the functions concerned, is studied in some detail. In this course the student gains a general introductory knowledge of the functions and reactions of plants, and learns to regard them from the dynamic standpoint as working organisms. Text: *A Textbook of Botany for Colleges*, by Ganong.

Laboratory.—A series of typical experiments is followed out in the laboratory and in the greenhouse. Each student is furnished with a set of the necessary apparatus, and learns to apply quantitative methods to the study of functions. Laboratory outlines are furnished by the department.

105. GENERAL BOTANY II. Freshman year, both semesters. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: General Botany I. Associate Professor Davis, Assistant Professors Gates and Haymaker, Miss Dalbey, and Miss Cashen.

A careful study is made of the morphology of the chief great groups of plants, of their physiology and ecology, of the classification and geographic distribution of the plant kingdom, and its economic relation to man. The latter part of the course is devoted to a systematic study of some of the more important plant families in which their floral structures are considered. Some time is given to the tracing out of unknown plants by means of a key.

Laboratory.—The aim of the laboratory in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity, and of their probable relations to one another as parts of an evolutionary series. Laboratory outlines are furnished by the department. Text: *A Textbook of Botany for Colleges*, by Ganong.

111. BOTANY. Elective, second semester. Class work, one hour; laboratory, six hours.** Three semester credits. Miss Dalbey.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

** Two of the required laboratory hours are used for report writing outside of the regular laboratory period.

This is a condensed course in general botany offered especially for students in the Division of Home Economics. In so far as the time allows, a study is made of the morphology of a few of the chief great groups of plants, of their elementary physiology and their anatomical structures, particularly with reference to the functioning of plant life. The latter portion of the course is devoted to a systematic study of the most important plant families, in which their floral structures are considered. Time is devoted to the tracing out of unknown wild flowers by means of a key, so that a student will be able to familiarize herself with the flora of any community where she may be. This course is designed to afford a sufficient foundation for teaching botany in a high school.

116. PLANT PATHOLOGY I. Sophomore year, first semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: General Botany II. Professor Melchers and Assistant Professor Haymaker.

The diseases affecting the chief economic crops of field, orchard, and garden are studied in considerable detail. The etiology of the various diseases and their most evident symptoms are considered. The student learns to recognize at sight the principal plant diseases he is likely to encounter on the farm, in the nursery, and in market-garden work. Non-parasitic and bacterial diseases are considered to some extent, but the time is devoted chiefly to the more important diseases caused by the fungi, the life histories of which are studied in some detail. Preventive measures are considered in each case. An extensive collection of preserved pathological material is available.

Laboratory.—Practical work in the recognition of all the more common plant diseases of the farm, orchard, and garden is accompanied by detailed microscopic studies of diseased tissues and identification of the fungous pathogens which cause them. Complete laboratory outlines, which likewise serve as a text in this course, are furnished by the department.

121. PATHOLOGY OF VEGETABLE FOOD PRODUCTS. Elective, first semester. Class work, one hour; laboratory, six hours.** Three semester credits. Prerequisite: High-school Botany, or its equivalent. Miss Dalbey.

This course is designed primarily for students in the Divisions of Home Economics and General Science. It deals with fungous and bacterial diseases and other maladies commonly recognized as the cause of decay or other deterioration in plant products, particularly in fruits and vegetables. The course offers opportunity to acquire the ability to recognize at sight the presence of fungi in fruits and vegetables as they occur on the market. The course aims to place emphasis on the presence of such infection and the results that can be expected when such products are bought on the market and stored under ordinary conditions.

Laboratory.—The laboratory work comprises a study of the organisms causing decay in plant food products. Attention is given to conditions affecting the growth and dissemination of the organism, especially temperature and light conditions, and points out the precautions which must be taken to prevent loss of food products through decay. Exercises are devoted to the proper way to select, buy, and store vegetables and fruit as they occur on the market. A study of these is made in the laboratory, since much of the laboratory material is obtained from the local market. In addition to this, an extensive collection of preserved material is available. Laboratory outlines are furnished by the department.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

** Two of the required laboratory hours are used for report writing outside of the regular laboratory period.

126. MEDICAL BOTANY. Sophomore year, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: High-school Botany or its equivalent. Assistant Professor Gates.

This is a lecture, laboratory, and reading course dealing with poisonous plants. The lecture includes a study of the principal stock-poisoning plants of the range; losses due to native poisonous plants, methods of identification, habitat, poisonous properties and methods of control and elimination.

Laboratory—The laboratory work follows the work presented in the lectures, and consists chiefly of a study of the native poisonous plants of the West, the identification of these plants by means of a descriptive key.

FOR GRADUATES AND UNDERGRADUATES

201. PLANT PATHOLOGY II. Elective, first semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: Plant Pathology I. Professor Melchers.

The class work consists primarily of a series of lectures pertaining to mycology, considering the subject from the evolutionary standpoint. The classification of fungi causing plant diseases receives considerable attention, and the relationship of the fungi to one another is emphasized. This course is designed to train those who wish to become more familiar with the classification of the fungi and their morphology; it is essential for those who wish to follow plant pathological work professionally.

Laboratory—The laboratory work consists of a detailed study of the genera of fungi. A large supply of plant-disease material in the department collections furnishes a basis for these studies.

202. FRUIT CROP DISEASES. Elective, first semester. Class work, one hour; laboratory, three hours.† Two semester credits. Prerequisite: Plant Pathology I. Assistant Professor Haymaker.

The class work consists of a series of lectures dealing with diseases affecting fruit crops of all kinds. Special emphasis is laid on measures and methods for controlling these diseases by means of spraying, sanitation, and varietal resistance. The preparation and practical application of the standard sprays are considered. Text: *Manual of Fruit Diseases*, by Hesler and Whetzel.

Laboratory.—This consists of a detailed study of each disease affecting the major fruit crops, together with a detailed microscopic study of the organisms causing the disease. The course is especially valuable for those studying horticulture or those expecting to specialize in plant pathology.

203. FIELD CROP AND VEGETABLE DISEASES. Elective, second semester. Class work, one hour; laboratory, three hours.† Two semester credits. Prerequisite: Plant Pathology I. Professor Melchers.

This class work consists of a series of lectures dealing with the historical development of phytopathology, with special emphasis on literature pertaining to field-crop and vegetable diseases. The field symptoms are discussed, varietal susceptibility and resistance are considered, and control measures are advised.

Laboratory.—This consists of a detailed microscopic study of the plant diseases attacking field crops and vegetables, and is of value to those who wish to pursue agronomic or horticultural work, and is especially designed for those students who expect to specialize in plant pathology.

208. PLANT PHYSIOLOGY I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: General Botany II. Professor Miller.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

† One of the required laboratory hours is employed in lecture and laboratory quizzes and reviews.

This course consists of a series of lectures on the more important phases of plant physiology. Such subjects as the root systems of plants, absorption, wilting coefficient, resistance to drought, transpiration, water requirement, photosynthesis, respiration, digestion, and growth are discussed in detail. The subject matter of plant physiology that pertains to agriculture is especially emphasized. The course is designed to give students a broad knowledge of the functions of plants and the more important factors which influence them. The work is supplemented by discussions, reference readings, and special reports.

215. PLANT HISTOLOGY. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: General Botany II. Miss Dalbey.

This course is planned to provide a thorough training in the principles and practice of microtechnical methods in botany, including the killing, fixing, and embedding of plant material, microtome work, and the staining and mounting, by various methods, of a tolerably complete and characteristic series of permanent slides, representing the vegetative and reproductive tissues of typical plants, taken from all the principal groups. Text: Chamberlain's *Plant Histology*.

220. BOTANICAL SEMINAR. Elective, both semesters. One hour session each week. One semester credit. For prerequisites, consult professor in charge.

The subject matter is outlined at the beginning of each semester and consists of the presentation of investigational work in botany, including the important branches of plant pathology, plant physiology, plant ecology, taxonomy, morphology, and genetics. Fundamental papers along botanical lines are reviewed and a digest is presented. It is expected that graduate students who are taking major or minor work in the Department of Botany will attend these sessions and take part in its programs.

222. EVOLUTION OF PLANTS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: General Botany II. Assistant Professor Haymaker.

Careful consideration is given to the lines along which evolution has proceeded in the plant kingdom, to the relationship of the more important phylla, and to the probable derivation of the chief groups of plants. Instruction is imparted by means of lectures and reference readings. Text: *Evolution of Plants*, by Campbell.

225. TAXONOMIC BOTANY OF THE FLOWERING PLANTS. Elective, first or second semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: General Botany II. Assistant Professor Gates.

The class work consists of a series of lectures dealing with the terms employed, the development of the more important systems of classification, and a consideration of families of plants.

Laboratory.—Selected flower types representing the principal orders and families of plants are studied and plants are identified in the field and in the laboratory.

228. ECOLOGY. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: General Botany II. Assistant Professor Gates.

The class work consists of a series of lectures dealing with the structure and dynamics of vegetation.

Laboratory.—With the opening of vegetation in the spring, field trips are taken to selected places.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

230. **PHYSIOLOGICAL PHENOMENA IN THE GERMINATION OF SEEDS.** Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: General Botany II. Associate Professor Davis.

This is a course in plant physiology in which the seed is used as the basis of the work in the laboratory. A study is made of the different factors in germination, as to water requirement, temperature, oxygen supply, light, permeability of seed coats by water, solutes, and gases; dormancy, agencies in so-called after-ripening, enzymes, etc. This course is of special interest to students in agronomy, or those who expect to take up work in connection with grain mills, seedhouses, etc.

232. **BOTANICAL PROBLEMS.** Elective, both semesters. From one to three semester credits. Prerequisites: General Botany II, and approval by the head of the department. Professors Melchers and Miller, Associate Professor Davis, Assistant Professors Haymaker and Gates, Miss Dalbey, and Miss Cashen.

In some instances a student may wish to pursue a special field of work which is not listed definitely in one of the undergraduate elective courses. Such a course may be arranged for upon consultation with the instructor.

FOR GRADUATES

301. **PLANT PATHOLOGY III.** Elective, second semester. Laboratory, nine hours.* Three semester credits. Prerequisite: Plant Pathology II. Professor Melchers.

This course is a continuation of Plant Pathology II. Its purpose is to give the advanced student an opportunity for making a closer and more extended study of the pathogenic organisms which cause plant disease. The course includes a somewhat detailed study of the cryptogamic herbarium. Considerable attention is devoted to the growing of pure cultures of pathogenic fungi, the making of inoculations, isolations of fungi, etc. The preparation of media of various kinds for the growing of fungi receives considerable attention. The course is especially designed for those who intend to pursue plant pathology as investigators in experiment stations.

302. **PLANT PATHOLOGY IV.** Elective, first and second semesters. Laboratory, nine hours.* Three semester credits. Prerequisite: Plant Pathology III. Professor Melchers.

This course involves original research. Problems are chosen by the student along some lines in which he is interested. A carefully worked-out report which summarizes the investigation undertaken, is required at the end of the semester.

308. **INVESTIGATIONS IN TAXONOMY AND ECOLOGY.** Elective, first and second semesters. Laboratory work, including conferences and field work, from six to twenty-four hours. From two to eight semester credits. Assistant Professor Gates.

Open to graduate students and especially qualified undergraduates upon approval of application. This course involves original research in a problem, chosen by or assigned to the student. The results are embodied in a written report presented at the end of the course.

310. **RESEARCH IN BOTANY.** Elective, both semesters. From three to twelve semester credits. Professors Melchers and Miller, Associate Professor Davis, Assistant Professors Haymaker and Gates, and Miss Dalbey.

Research problems in the various fields of botany may be outlined. A member of the department staff, acting as major instructor, is in charge. Upon completion of the work it may be submitted in part or as a whole toward a thesis.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

Chemistry

Professor KING
Professor SWANSON
Professor HUGHES
Associate Professor NEWMAN
Associate Professor BRUBAKER
Associate Professor COLVER
Instructor WEST

Instructor HARRISS
Instructor KEITH
Instructor SPICER
Instructor SKOURUP
Instructor BRUNER
Instructor HARROUFF

All of the industries are becoming more and more dependent for their highest success upon intelligent application of the sciences, and the social sciences are making their greatest progress by tracing their phenomena back to the physical and chemical changes that accompany them. A study of chemistry and physics is therefore essential to any understanding of the processes of nature or of human industry. In the instruction in chemistry the aim is to insist upon a mastery of the chief concepts of the pure science through the agency of textbook drill, accompanied by demonstrations in the lecture room, and experimental observation by the student himself in the laboratory. As the course proceeds, illustrations of chemical principles are drawn from the industrial processes of the chemical, agricultural, domestic, and other arts, thus impressing upon the mind the practical nature of the study. The ultimate object of instruction in this science is to develop in the student the power to form independent judgments upon the manifold problems of daily life in which chemistry plays a part.

The lecture rooms are amply equipped for experiments and demonstrations, and the laboratories are designed to accommodate 936 students each semester in freshman work and qualitative analysis. The laboratories for more advanced work provide space for 324 students, and are well supplied with general and special facilities. The state work in foods, feeding stuffs, and fertilizers, and the chemical investigations of the Experiment Station in soils, crops, animal nutrition, etc., afford unusually good opportunities for students to obtain experience in practical chemistry. In all of the laboratory work the student is required to give the designated amount of time, and at least a certain amount of work must be satisfactorily performed in order to obtain credit.

COURSES IN CHEMISTRY

FOR UNDERGRADUATES

101. CHEMISTRY I. Freshman year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: High-school physics. Professor King, Associate Professor Newman, Mr. West, Miss Harriss, Mr. Keith, Miss Bruner, Mr. Harrouff, and Mr. Skourup.

This work begins the study of general chemistry, and is designed, with that of the succeeding semesters, to give the student a knowledge of the fundamental principles of chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions, the principles of nomenclature, the significance of formulas, chemical equations, etc., much attention is given to these, while at the same time the practical uses of the substances, and the processes used in metallurgy, engineering, agriculture, and other arts are emphasized. McPherson and Henderson's *A Course in General Chemistry* is used as a

textbook, this semester's work covering the first 331 pages. The text is supplemented by lectures and is amply illustrated by experimental demonstrations.

Laboratory.—As far as time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required, as far as possible, to study experiments in that light. In this, as in all other laboratory work in chemistry, the objects are to illustrate chemical phenomena, and to teach care in manipulation, attentive observation, logical deduction, and discrimination and accuracy in recording results and conclusions. The student is required to give the designated amount of time, and a minimum amount of work must be satisfactorily performed in order to obtain credit. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

102. CHEMISTRY II. Freshman year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry I. Teachers same as for Chemistry I.

The work in this course for the first half of the semester is a completion of the study of general chemistry begun the preceding semester. The second half of the semester is devoted to the study of the general principles of qualitative analysis as outlined in an *Elementary Treatise on Qualitative Analysis*, by William McPherson.

Laboratory.—In the laboratory the student studies the ordinary methods of separation and detection of the more common metals, non-metals, acids, bases, and salts. The teaching of analysis as such is a secondary object, although the student is held to the exact observation and careful reasoning required in ascertaining the composition of single substances and mixtures. The effect of the course is to broaden, strengthen, and unify the student's ideas of general chemistry.

105. CHEMISTRY AV-I. Freshman year, first semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Mr. West.

This course deals with the fundamental laws and theories of chemistry, the elements and their inorganic compounds, and lays emphasis on the application of chemistry to the arts and industries. Both the metals and nonmetals are studied, but the treatment is less detailed than in Chemistry I and II.

Laboratory.—The laboratory work is intended to give the student training in manipulation and first-hand knowledge of the important laws of chemistry and the properties of substances studied, by use of appropriate experiments which the student himself performs.

106. CHEMISTRY V-II. Freshman year, second semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry AV-I. Mr. West.

This course follows Chemistry AV-I and has the same general object, but deals with the organic compounds.

Laboratory.—The laboratory work consists in the preparation of certain organic compounds and qualitative study of their properties.

107 and 108. CHEMISTRY E-I and E-II. Freshman year, both semesters. Lectures and recitations, three hours; laboratory, three hours. Four semester credits each. Prerequisites and teachers same as for Chemistry I and II.

These courses cover the work of general chemistry and qualitative analysis. The relative amount of time spent upon these subjects is the

same as in Chemistry I and II with the exception of the laboratory. Instead of spending six hours a week in laboratory, students in these courses spend three hours. Throughout all the work in these courses emphasis is placed upon those phases of chemistry which have a special bearing upon engineering materials. Texts: Same as for Chemistry I and II.

120. ORGANIC CHEMISTRY. Sophomore year, both semesters. Lectures and recitations, two hours; laboratory, three hours. Three semester credits. Prerequisite: Chemistry II. Associate Professors Colver and Brubaker, and Mr. West.

This course is given for the students in the Division of Agriculture, and includes a careful study of the aliphatic series of hydrocarbons, alcohols, ethers, aldehydes, ketones, organic acids, esters, fats, waxes, carbohydrates, and proteins. Attention is directed to the characteristic properties and relationships of these various classes of compounds and typical members of each group are studied particularly from the standpoint of structure, laboratory preparation and chemical properties as shown by their reactions. Emphasis is placed upon the work bearing upon agricultural pursuits. Text: Norris, *Organic Chemistry*, in part, accompanied by lectures.

Laboratory.—The laboratory work is arranged to parallel the study in the classroom, and includes the preparation of a limited number of organic compounds and a study of their properties and reactions. The experiments include work with fats, carbohydrates, and proteins. The laboratory directions which are used have been prepared and are supplied by the department.

121. ORGANIC CHEMISTRY HE. Sophomore year, both semesters. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry II. Associate Professors Colver and Brubaker, and Mr. West.

This course is for students in the Division of Home Economics and is outlined to give a firm foundation for advanced work in foods and nutrition. A systematic study is made of the more important classes of organic compounds, particularly the aliphatic hydrocarbons, alcohols, ethers, aldehydes, ketones, organic acids, fats, soaps, sugars, starch, and proteins. In addition to a study of aliphatic compounds a brief consideration is also given to several series of aromatic compounds. Especial attention is given to those organic compounds which are used for clothing, fuel, light, antiseptics, disinfectants, anæsthetics, medicine, solvents, in the commercial manufacture of other important products, as well as to many other compounds which contribute to a fuller understanding of the systematic relations existing among all organic compounds. Text: Norris, *Organic Chemistry*, in part, accompanied by lectures.

Laboratory.—In the laboratory the student prepares one or more representative examples of most of the classes of compounds taken up in the classroom. A study is made of their physical properties and their chemical properties as shown by typical reactions. The experiments include work with fats, carbohydrates, and proteins. The laboratory directions which are used have been prepared and are supplied by the department.

150. QUANTITATIVE ANALYSIS I. Sophomore year, both semesters. Laboratory, six hours. Two semester credits. Prerequisites: Chemistry I and II. Associate Professor Brubaker.

This course is planned to give the student a knowledge of the simpler operations in gravimetric analysis and volumetric analysis and to lay the foundation for studies in which such knowledge is required. Particular emphasis is laid on the importance of exact quantitative work and its value in investigations connected with agriculture. Textbook: *Notes on Quantitative Chemical Analysis*, by C. W. Folk.

FOR GRADUATES AND UNDERGRADUATES.

202. **INORGANIC PREPARATIONS.** Junior year and elective, both semesters. One semester credit for each three hours of laboratory work. Prerequisite: Chemistry II or Chemistry HE-II. Professor King.

Students of Advanced Inorganic Chemistry are advised to take this course. It consists in the preparation and purification of some typical inorganic compound, together with those of more complex composition and compounds of the rarer elements.

203 and 204. **INDUSTRIAL CHEMISTRY I AND II.** Senior year and elective, first and second semesters, respectively. Given in 1919-'20 and alternate years thereafter. Class work, three hours; laboratory, six hours. Five semester credits each semester. Prerequisite: Organic Chemistry. Associate Professor Brubaker.

This course treats the more important technical processes. Considerable attention is given to general operations and the machinery employed. The more important commercial manufacturing industries are then taken up, including, with others, the production of alkalies, acids, glass, clay products, cement, paint, pigments, oils, varnish, soap, gas, paper, leather, petroleum, sugars, starch and the products of fermentation and the destructive distillation of wood and coal. Textbook: *Manual of Industrial Chemistry*, by Rogers and Aubert.

205. **INDUSTRIAL ELECTROCHEMISTRY.** Junior year and elective, second semester. Offered in 1920-'21 and alternate years thereafter. Class work, two hours. Two semester credits. Prerequisite: College courses in general chemistry and physics. Associate Professor Brubaker.

In this course are treated briefly the principles of voltameters, electrochemical methods of analysis, electroplating, electrotyping, and the production of metallic objects by electroplating methods. This is followed by fuller treatment of electrolytic refining of metals, the manufacture of various industrial products by electrolytic methods, primary cells, the lead storage battery, the Edison storage battery, the electrometallurgy of iron and steel, and the fixation of atmospheric nitrogen. Textbook: Thompson's *Applied Electrochemistry*.

206. **PHYSICAL CHEMISTRY.** Junior year, first semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Organic Chemistry, and Quantitative Analysis; and although not a prerequisite, calculus is recommended. Professor King.

This course is especially adapted to those students desiring a broader knowledge of the more fundamental laws of chemistry. A brief study is made of the modern conception of the atom and radioactive phenomena. A more extensive study is made of the relations found to exist with matter in the gaseous, liquid and solid states. Emphasis is placed upon the following phenomena: Osmosis; solution, including colloids; surface tension; absorption; equilibria; thermochemistry; ionization; hydrolysis; electromotive force and hydrogen ion concentration.

Laboratory.—The laboratory follows very closely the subject matter of the lectures.

207. **ADVANCED INORGANIC CHEMISTRY.** Sophomore year and elective, first semester. Class work, three hours. Three semester credits. Given in 1920-'21 and alternate years thereafter. Prerequisite: Chemistry II or Chemistry HE-II. Associate Professor Newman.

The course consists of a thorough study of the facts of chemistry and their theoretical interpretations according to the views of the present day. Special stress is placed upon the properties of the elements as a basis for methods of classification, and upon the rarer elements and compounds. Text: *Modern Inorganic Chemistry*, by J. W. Mellor.

208. HISTORY OF CHEMISTRY. Junior year, second semester. Lecture work, one hour. One semester credit. Prerequisite: Physical Chemistry. Dean Willard.

These lectures deal with the history concerning the development of the principal laws and theories of chemistry, special emphasis being placed upon the failures and triumphs of the founders of chemical science.

209. SURFACE TENSION AND RELATED PHENOMENA. Elective and graduate, second semester. Lectures, two hours. Two semester credits. Prerequisite: Physical Chemistry (Chem. 206). Professor King.

This course of lectures deals with surface tension phenomena. Attention is devoted to methods of measuring surface tension, to surface energetics, and particularly to the relation of surface tension to absorption, and colloidal formation.

210. CHEMICAL STATICS AND DYNAMICS. Elective and graduate, second semester. Lectures and assigned reading, two hours. Two semester credits. Prerequisite: An approved course in Physical Chemistry. Professor King.

This course of lectures deals with the general topics of chemical equilibria, velocity of chemical reactions, hydrolysis, catalysis, etc.

211. PAINT OILS AND PIGMENTS. Elective and graduate, first semester. Lectures and assigned readings, two hours. Two semester credits. Prerequisite: Satisfactory courses in Organic Chemistry and Quantitative Analysis. Professor King.

This course consists of a series of lectures and assigned readings on the extraction, purification, and properties of the oils commonly used in paints, on the manufacture and properties of paint pigments, and on a general survey of the products employed as protective coverings for both wood and metal.

212. CHEMICAL THERMODYNAMICS. Elective, second semester. Lectures and assigned readings, two hours. Two semester credits. Prerequisites: Approved courses in Physical Chemistry and Calculus. Professor King.

The object of this course is to present those fundamental principles of thermodynamics which are particularly applicable to chemistry. Among the subjects discussed are, the first and second laws of thermodynamics and their applications to fusion, evaporation, phase rule, chemical equilibrium, chemical affinity, electromotive force, surface tension and absorption.

218. ORGANIC CHEMISTRY I. Sophomore year, first semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: Chemistry II. Associate Professor Colver.

This course is for those students who expect to take a second semester of organic chemistry. The aliphatic hydrocarbons, alcohols, ethers, aldehydes, ketones, acids, esters, amides, acylhalides, acid anhydrides, amines, halogen substituted acids, amino acids, hydroxy acids, aldehyde acids, ketone acids, hydroxy aldehydes, hydroxy ketones, and related compounds are considered particularly from the standpoint of structure, methods of laboratory and commercial preparation, reactions, and uses. Special attention is given to such topics as structural, geometrical, and optical isomerism, and the use of acetoacetic ester and malonic ester in organic synthesis. Reference: Perkin and Kipping, *Organic Chemistry*.

Laboratory.—The laboratory work parallels the lectures and includes the preparation, purification, and reactions of one or more typical examples of most of the groups of compounds studied in the classroom. The laboratory directions which are used have been prepared and are supplied by the department.

219. ORGANIC CHEMISTRY II. Sophomore year, second semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: Organic Chemistry I. Associate Professor Colver.

This course is a continuation of Organic Chemistry I and takes up in analogous manner the structure, methods of laboratory and commercial preparation, reactions and uses of the aromatic compounds. Particular attention is also given to the orientating influence of various groups, the structure and reactions of the diazonium compounds, and a brief study is made of the different classes of dyes, the alkaloids, the terpenes, and a few heterocyclic compounds.

Laboratory.—In the laboratory the student carries out various preparations that illustrate the reactions which are characteristic of aromatic compounds, such as bromination, sulfonation, nitration, acetylation, diazotization, and replacement and coupling of the diazonium group. A portion of the laboratory work includes the determination of carbon, hydrogen, and nitrogen in pure unknown organic compounds by the combustion method. Laboratory guide: Noyes, *Organic Chemistry for the Laboratory*.

223. ORGANIC PREPARATIONS. Senior year, first semester. Laboratory, three to fifteen hours. One to five semester credits. Prerequisite: Organic Chemistry II. Associate Professor Colver.

The compounds prepared in this course are so chosen as to give the student a thorough knowledge of the fundamental principles of synthetic organic chemistry.

224. QUALITATIVE ORGANIC ANALYSIS. Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: Organic Chemistry II. Assistant Professor Colver.

This is primarily a laboratory course designed to impress upon the student's mind the characteristic reactions of the various classes of organic compounds. The first few weeks are spent in carrying out class reactions, using known compounds; the remainder of the semester is devoted to the classification and identification of pure, unknown substances and mixtures. Manual: *Class Reactions and Identification of Organic Substances*, by Noyes and Mulliken; reference book, *A Handbook of Organic Analysis*, by H. T. Clarke.

225. STEREOISOMERIC AND TAUTOMERIC COMPOUNDS. For graduate and advanced students in chemistry, second semester. Lectures, two hours. Two semester credits. Prerequisite: Organic Chemistry II. Assistant Professor Colver.

The course consists of lectures and assigned readings upon such special topics of organic chemistry as optical isomerism, particularly the older and more recent methods of determining the configuration of the asymmetric carbon atoms of sugars; geometrical isomerism; and ketonol tautomerism.

226. CARBOCYCLIC AND HETEROCYCLIC COMPOUNDS. For graduate and advanced students in chemistry, second semester. Lectures, two hours. Two semester credits. Prerequisite: Organic Chemistry II. Assistant Professor Colver.

The course consists of lectures and assigned readings upon carbocyclic and heterocyclic compounds. In the study of the carbocyclic compounds the structure, orientation, methods of synthesis, and reactions of benzene, naphthalene, anthracene, and derivatives are considered in much greater detail than is possible in an elementary course. The heterocyclic compounds studied include furane, pyrrol, thiophene, pyridine, quinoline, isoquinoline, purine, pyrimidine, hydantoin, and some structurally related substances, such as certain classes of dyes, the alkaloids, and uric acid.

230. PRINCIPLES OF ANIMAL NUTRITION. Elective and graduate, second semester. Class work, three hours. Three semester credits. Prerequisite: Organic Chemistry. Associate Professor Hughes.

This course gives a thorough study of the relations of animals to matter and energy, and the physiological principles involved. Study of the researches which have established the principles of nutrition constitutes the ground work of the course.

231. PHYSIOLOGICAL CHEMISTRY. Elective and graduate, second semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: An acceptable course in organic chemistry. Associate Professor Hughes.

This course is designed to meet the needs of students who expect to specialize in nutrition or in one of the biological sciences. It is a systematic study of the synthetic and analytical chemical changes that accompany the physiological processes of animals and plants. The chemical properties of food and body substances, and their general specific functions; the changes that take place in digestion, assimilation and elimination, and the means by which these are brought about; enzymes and their functions; the blood and lymph; general metabolism, and the interrelations of organs, are among the important topics studied. Text: Mathews' *Physiological Chemistry*.

Laboratory.—The laboratory work is designed to familiarize the student with the compounds and processes discussed in the lectures and recitations. Laboratory guide: Mathews' *Physiological Chemistry*.

232. PHYSIOLOGICAL CHEMISTRY I. Senior year, first semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisite: Organic Chemistry. Associate Professor Hughes.

This course is designed to meet the needs of students who expect to specialize in nutrition or one of the biological sciences. It treats of the chemistry of carbohydrates, lipins and proteins, and the chemical changes which these undergo during the processes of digestion and metabolism.

Laboratory.—The laboratory work is designed to familiarize the student with the compounds and processes discussed in the class work.

233. PHYSIOLOGICAL CHEMISTRY II. Senior year, second semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisite: Physiological Chemistry I. Associate Professor Hughes.

This is a continuation of Physiological Chemistry I. It includes the chemistry of the body tissues and excretions.

Laboratory.—The laboratory work includes a qualitative and quantitative study of the tissues and excretions discussed in the class work.

234. BIOCHEMICAL PREPARATIONS. Senior year, second semester. Laboratory work, fifteen hours. Five semester credits. Prerequisites: Organic Chemistry II, and Physiological Chemistry I. Associate Professor Hughes.

This course includes the isolation, purification, and analysis of a number of compounds which are of importance in biochemistry and nutrition.

235. PATHOLOGICAL CHEMISTRY. Elective and graduate. Class work, two hours. Two semester credits. Prerequisite: An approved course in physiological chemistry. Associate Professor Hughes.

This course presents the chemical facts pertaining to abnormal nutritional processes. The chemical factors involved in the causation, progress and results of disease are discussed under the following heads: inflammation, degeneration, infection, anemia, tuberculosis, dyspepsia, typhoid fever, jaundice, nephritis, diabetes, gout, rheumatism, intoxication, etc.

240. ADVANCED QUALITATIVE ANALYSIS. Elective and graduate, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Associate Professor Newman.

This course is designed to broaden the student's knowledge of chemistry by a systematic study of the properties of the acid and basic elements and their compounds as shown in a detailed study of systematic analysis. Many of the rarer elements are included. A study of the application of chemical theory to analytical reactions is taken up in considerable detail with the aim of familiarizing the student with the important theories as applied to analytical procedure. Reports are made on assigned reference work.

241. **QUANTITATIVE ANALYSIS.** Sophomore year, second semester. Class work, one hour; laboratory, twelve hours. Five semester credits. Prerequisite: Chemistry II or its equivalent. Associate Professor Brubaker.

The subject matter considered in this course is practically the same as that given in courses 250 and 251, and is arranged for students taking one of the chemistry curricula.

242. **FIRE ASSAYING.** Junior year, first semester. Laboratory work, six hours. Two semester credits. Prerequisite: Quantitative Analysis. Associate Professor Newman.

In this course the student becomes familiar with the ordinary methods of fire assaying. Some attention is also paid to wet assaying. Fire assays of ores containing metals such as copper, zinc, lead, bismuth, tin, silver, and gold are made.

243. **GAS ANALYSIS.** Junior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Quantitative Analysis. Associate Professor Brubaker.

The work in this course acquaints the student with the use of standard apparatus in the analysis of gases. Analyses of air, flue and furnace, and illuminating gases are made.

245. **MICROCHEMICAL METHODS OF ANALYSIS.** Elective and graduate. Laboratory, three hours. One semester credit. Prerequisites: Elementary Organic Chemistry, and Quantitative Analysis I. Associate Professor Brubaker.

The microscope is a very useful instrument in chemical analyses. The technical chemist finds it indispensable, and its applications are steadily increasing. The object of this course is to teach the student the various methods of using the microscope in chemical analysis, both qualitative and quantitative, applied to both inorganic substances and to vegetable or animal products.

250. **QUANTITATIVE ANALYSIS II.** Elective and graduate, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Associate Professor Brubaker.

This course is the first half of a year's work and covers the general procedure of gravimetric analysis and volumetric analysis, together with a discussion of chemical theory as applied to quantitative reactions. Particular attention is paid to the commercial significance of the procedures studied. The work for the first part of the semester consists of a selected series of gravimetric determinations designed to develop accuracy in a number of fundamental operations. During the second part of the semester, solutions of acids, bases and oxidizing agents are standardized and used in analysis. Reports are made on assigned reference work for the study of methods of analysis not taken up in class. Textbook: *Quantitative Analysis*, by Edgar G. Mahin.

251. **QUANTITATIVE ANALYSIS III.** Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Quantitative Analysis II. Associate Professor Brubaker.

This is a continuation of Quantitative Analysis II, and applies the fundamental principles of quantitative work to the analysis of important industrial products and raw materials, including paints, soaps, oils, bituminous materials, coal, gas, water, iron and steel, and other substances, the choice of the work being determined by the instructor in consultation with the student. The chemical theories underlying the methods used are also considered in some detail. Textbook: *Quantitative Analysis*, by Edgar G. Mahin. Other standard works on quantitative analysis are used as references.

252. CHEMISTRY OF SOILS AND FERTILIZERS. Senior year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Quantitative Analysis I. Associate Professor Swanson.

The class work takes up the chemical composition of soils and fertilizers, and those chemical changes in the soil which are most important in affecting plant growth. Attention is also given to colloids and soluble salts in relation to optimum soil conditions. The course is adapted especially to the needs of students of soils.

Laboratory—The laboratory work is planned to give the student a knowledge of the most important chemical methods used in the analysis and investigation of soils and fertilizers.

253. CHEMISTRY OF CROPS. Senior year, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: Organic Chemistry, and Quantitative Analysis I. Associate Professor Swanson.

In the class work a detailed study is made of the chemical composition of substances present in plants and plant products; the most important chemical transformations which take place in plant growth; and enzymes and colloids in relation to plant substances and plant growth.

Laboratory.—The laboratory exercises are planned to give the student a working knowledge of the most important methods used in the analysis and investigation of substances present in plants and plant products.

254. DAIRY CHEMISTRY. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: Organic Chemistry, and Quantitative Analysis I. Associate Professor Swanson.

The class work is centered chiefly upon the following: A detailed study of the chemical compounds present in milk, butter, cheese, and other dairy products; chemical changes affected by conditions of handling dairy products; a review of literature relating to recent investigational work in dairy chemistry.

Laboratory.—The laboratory exercises are designed to give the student a working knowledge of the most important chemical methods used in the analysis and investigation of dairy products.

255. CHEMISTRY OF MEATS. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry, and Quantitative Analysis I. Associate Professor Swanson.

The class work includes the following: A detailed study of the chemical compounds present in the edible portions of meat animals; chemical changes effected by different methods of preparing and storing meat products; a review of recent literature relating to investigational work in the chemistry of meat and meat products.

Laboratory.—The laboratory exercises are designed to give the student a working knowledge of the most important chemical methods used in the analysis and investigation of meats and meat products.

257. FOOD ANALYSIS. Junior year, second semester. Laboratory work, nine hours. Three semester credits. Prerequisites: Organic Chemistry, and Quantitative Analysis I. Associate Food Analyst De Rose.

This course includes the quantitative methods employed in the analysis of the various kinds of foodstuffs. It also includes practice in testing for the presence of adulterants, preservatives, and coloring materials.

260. **ADVANCED QUANTITATIVE ANALYSIS.** Junior year and elective, first semester. One credit for each three hours of laboratory work. Prerequisites: Quantitative Analysis I or Quantitative Analysis II and III. Associate Professor Brubaker.

Under this heading provision is made for the election of any kind of quantitative chemical work not otherwise designated. The various research and state laboratories afford a large opportunity for advanced work.

265. **HOUSEHOLD CHEMISTRY.** Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry. Associate Professor Brubaker.

The lectures cover the chemistry of numerous problems of air, water, soap, laundering, dry cleaning, food and cookery, and textiles. A portion of the lecture time is given to reciting on the subject matter of previous lectures and of the laboratory work. References are given for study.

Laboratory.—The laboratory work consists largely of quantitative exercises dealing with air, water, soap, foods, food accessories, and textiles.

270. **CHEMISTRY PROBLEMS.** Elective, both semesters and summer school.

Individual problems to fulfill the thesis requirements of students in agricultural chemistry, biochemistry, and industrial chemistry curricula are taken up in this course.

275. **CHEMISTRY SEMINAR.** Once a week, throughout the year, the officers of the department, with the more advanced students and such others as wish to, meet for papers and discussions upon topics representing the progress of chemical science, chiefly as found in the current journals. The preparation of subjects for presentation at these meetings may be made a part of the credit work of advanced students.

FOR GRADUATES.

301. **CHEMICAL RESEARCH.** Excellent opportunities are offered students to undertake research work in chemistry. Such work is being constantly conducted in the laboratories of the department in connection with the Agricultural and Engineering Experiment Stations. The State Food Laboratory and the laboratories for analysis of feeds and fertilizers are also accessible to students desiring research along such lines. Much emphasis is placed upon research in the department, and all graduate students whose training is adequate are encouraged to participate. Students working out their master's thesis in the Department of Chemistry are assigned to this course. Work is offered in the following lines:

Agricultural Chemistry. Professor Swanson.

Analytical Chemistry. Associate Professors Newman and Brubaker, and Assistant Professor Latshaw.

Organic Chemistry. Associate Professor Colver.

Biochemistry. Professor Hughes.

General and Physical Chemistry. Professor King.

Economics and Sociology

Professor KAMMEYER
Professor BURR

Vocational training alone does not fully prepare a student for his life work, nor for the acceptable discharge of his duties as a citizen. It is necessary that he should have at least a general knowledge of the economic and social conditions under which he will live and work, in order that he may become a useful member of society. The state needs men and women trained for citizenship. It is the purpose of the Department of Economics and Sociology to plan and direct its work with this need in view.

A department library of well-selected books and pamphlets bearing on economics, sociology, and statistics is at the disposal of the students, and is used for collateral readings, book reviews, and reports.

COURSES IN ECONOMICS

FOR UNDERGRADUATES

101. **ECONOMICS.** Junior and senior years, both semesters. Class work, three hours. Three semester credits. Professor Kammeyer.

This is a course in the fundamentals of economic science, including a study of man's wealth-getting and wealth-using activities as they manifest themselves in the consumption, production, exchange, and distribution of commodities and services. Budgets, factories and expenses of production, money, banking, wage systems, labor organizations, rent, interest and profits are some of the leading topics for study and class discussion. These phenomena are here studied in conjunction with the laws or social conventions which control or influence them, such as the federal-reserve systems, the farm-loan act, legal restrictions concerning commerce, strikes, child labor, trusts, monopolies, and the like. The application of economic principles to such subjects as taxation, socialism, insurance, etc., is also considered. Supplementary reading of current literature, reference books, the keeping of notes, and periodical written reports are required. A combination of the textbook and lecture methods is followed. Text: Turner's *Economics*.

106. **BUSINESS ORGANIZATION.** Senior year and elective, both semesters. Class work, one hour. One semester credit. Prerequisite: Economics. Professor Kammeyer.

Individual proprietorship, partnership and corporation as forms of business organization and management; the advantages and disadvantages of each, and legislative restrictions are studied in this course. The selling plans, advertising methods and systems of credits and collections used by typical manufacturing and distributive industries are made the basis of study and reports. Attention is given also to the origin and operation of markets and exchanges, to cost accounting, and special systems of wage payment. Instruction is by recitations, lectures, and reports. Text: Jones's *Administration of Industrial Enterprises*.

111. **LABOR PROBLEMS.** Elective, both semesters. Class work, two hours. Two semester credits. Professor Kammeyer.

The history, organization, functions, and legal status of labor unions in the United States and in the principal countries in Europe are discussed. Statistics and judicial decisions relating to strikes, boycotts, picketing, arbitration, etc., are subjects of study and investigation. The course also includes a study of the various plans that have been proposed

and tried for the more equitable distribution of wealth, such as coöperation, profit-sharing, industrial partnership, etc. Instruction is by lectures, assigned readings, and reports. Text: Groat's *Organized Labor in America*.

116. MONEY AND BANKING. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Economics. Professor Kammeyer.

The first half of this course is devoted to a study of the nature, history and functions of money; its place as a factor in man's economic progress, and its importance as such in his business activities as organized to-day; money standards and systems, monometallism, bimetalism, limping standard, paper standard, gold-exchange standard; coinage and coinage laws; instruments of credit, bills of exchange, drafts; clearing houses. The second half of the course takes up the subject of banking. Banking in its historic forms is briefly considered as a preparation for a more detailed study of the federal-reserve system, the federal farm-loan system, and state banks, particularly Kansas state banks. To this is added a study of savings banks, trust companies, building and loan associations and other institutionalized forms of credit. Instruction is by lectures and reports. Text: Holdworth's *Money and Banking*.

121. ECONOMIC GEOGRAPHY. Elective, first semester. Class work, three hours. Three semester credits. Mr. ———.

This is a discussion of the important facts of the economic world and a study of production and trade as they are influenced by geographical conditions. The geography of the more important commercial products of farm, range, forest, mine, factory, and sea; transportation and manufactures; great commercial and manufacturing centers, and types of commercial nations are considered. Stress is given to the natural resources of the United States as factors in the national development. This includes the current movement to conserve natural resources; the improvement and extension of waterways; the control of water power and water supply. Instruction is imparted by lectures, library work, and study of a text. (Not offered in 1920-'21.)

126. BUSINESS MANAGEMENT. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Economics. Professor Kammeyer.

Plant location and structure; the organization and management of industrial forces; distribution of manufactured goods, with especial attention given to the problems involved in relations of manufacturers, middlemen and consumers; the organization of the sales department; sales management and the art of selling; typical advertising campaigns of different classes of producers; costing and its spread to the different elements of production, are subjects studied in this course. Instruction is given by lectures, library work, and study of the text.

131. COST ACCOUNTING. Elective, both semesters. Class work, two hours. Two semester credits. Mr. ———.

Following a review of the principles of accounting, a general survey of the more important principles of cost accounting is made. This course is concerned particularly with the subject of production costs. The student is expected to keep the principles of costing in mind throughout the whole course, to the end that he may be able to adapt these working principles to concrete problems. Attention is given to the calculation and the distribution of overhead costs, and to the organization of cost systems. Practical problems are given for solution and as means of illustrating and applying the principles. Lectures, laboratory work, and study of the text are the methods of instruction. (Not offered in 1920-'21.)

FOR GRADUATES AND UNDERGRADUATES

213. PUBLIC FINANCE. Elective, second semester. Class conference, two hours. Two semester credits. Prerequisite: Economics. Professor Kammeyer.

This course embraces a study of public revenues and public expenditures; the development of tax systems; proposed reforms; public indebtedness; budgets; and other phenomena of financial administration. Instruction is by assigned readings, lectures, and reports.

225. CURRENT ECONOMIC PROBLEMS. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Economics. Professor Kammeyer or Professor Burr.

This course is intended to supplement Economics, course 201, and to give an opportunity to those who elect it to make a more intensive study of selected economic problems than was possible in that course. The subject matter varies, of course, to harmonize with changing economic conditions. At present the problems of economic insecurity, of population, of railway regulation or ownership, of international trade, of trade-unionism and of taxation are of dominant interest and importance. These, or as many of them as time permits, are made the subject of careful study, classroom discussion and written reports. Materials are gathered from reference books, government publications, magazines and newspapers, and especial effort is made to encourage the student to think independently and to formulate his own judgments.

COURSES IN SOCIOLOGY

FOR UNDERGRADUATES.

151. SOCIOLOGY. Elective, both semesters. Class work, three hours. Three semester credits. Professor Burr.

A careful study is made of the fundamental principles of social life as related to other scientific principles. Special consideration is given to their practical application to social action and organization. While proper attention is given to social pathology; poverty, its causes and remedies; crime, its causes and prevention; and to remedial legislation and correctional agencies—special emphasis is placed upon normal constructive social evolution. The processes of socialization, social forces, and social control, particularly in their relation to commercial, industrial and professional leadership, receive special stress. The purpose is to give the student sufficient knowledge of the origins, processes, and meanings of social action to lead him to more specialized study if he so elects, or otherwise to enable him to become an intelligent and leading factor in either urban or rural community life. Problems and opportunities are given for original investigation. Assigned library readings and written reports are required. Instruction is by recitation, class discussion, and lectures. Text: Hayes's *Introduction to Sociology*.

156. RURAL SOCIOLOGY. Elective, both semesters. Class work, three hours. Three semester credits. Professor Burr.

The student should, preferably, precede this course by one in sociology. The principles of sociology are applied to rural conditions. A careful review is made of the history of the country-life movement. A special study is made of the social values and problems of the rural community, including the home, the school, the church, societies and organizations, and the relation of the state to general rural welfare. Special emphasis is placed upon the study of the community as such, its normal area, the relationship between city and country, with theories and methods for unifying and socializing the enlarging community. The social effect of new rural economic movements is briefly dealt with. The purpose of the course is to enable the student to qualify for a more specialized study of rural organization, or to become an intelligent and leading factor as a citizen in a rural community. Text: Voght's *An Introduction to Rural Sociology*.

FOR GRADUATES AND UNDERGRADUATES.

257. **SOCIAL PROBLEMS.** Elective, both semesters. Class work, two hours. Two semester credits. Professor Burr.

Social activities and social legislation and constructive methods of dealing with present social conditions are studied. In the early part of the course a general study is made of social conditions growing out of immigration, modern industry, city developments, and population movements. Next is taken up a study of charity and reform organization, including special attention to "case-taking." Such organized activities are studied with reference to both urban and rural problems. Further attention is given to the condition and care of the wards of society: deaf, blind, epileptic, insane, criminal; delinquent, dependent, and defective children; and the laws and institutions seeking to solve the problems involved. The purpose is to give the student a working knowledge of these social problems, and qualify him, if he so wishes, for a position of professional service in social and industrial welfare organization. Instruction is by lectures, text and library work. Opportunity is given for original investigation and practical experience.

261. **RURAL LEADERSHIP.** Elective, second semester. Class work, one hour. One semester credit. Professor Burr.

This is a lecture course and leadership conference. Entrance is by special permission of instructor. Although exceptions will be made, students applying for admission will ordinarily be expected to have previously studied Sociology and Rural Sociology. Preference in admission will be given to seniors and graduate students who have already, at least tentatively, chosen their life vocations. Attention is given to qualities that make for success or failure in modern community leadership. Some of the subjects dealt with are: opportunities for leadership; the need of a world vision; community consciousness; training the followers; leading by indirection; volitional evolution; coöperative leadership, etc. While the work is considered from the rural viewpoint, the principles and policies dealt with are equally valuable to one intending to enter a position of leadership in urban commercial and industrial life. Liberal use will be made of bulletins and library reference material.

264. **RURAL ORGANIZATION.** Elective, both semesters. Class work, two hours. Two semester credits. Professor Burr.

An exhaustive study is made of organizations now working in the rural field, and their present status. The work is considered from the standpoint of the development of the rural community as an economic and social unit. The functions of the community are classified, each function carefully analyzed, and a study made of the organizations and projects by means of which the community performs its various functions. The student is encouraged to make a study, on the functional basis, of his own community, or of one where he can get proper access to necessary sources of information. During the semester occasional lectures are presented by such rural leaders as the dean of extension, the state leader of county agents, the director of home economics in extension, the state leader of home demonstration agents, the state supervisor of county health nurses, the secretary of the state farm bureau, and leaders of other modern effective rural organizations and projects. The purpose of the course is to assist advanced students who have fulfilled other educational requirements to qualify further for positions as county agents, home demonstration agents, county welfare officers, extension specialists, county health nurses, and the like. Instruction is by class conferences, library work, bulletin material and lectures.

Education

Professor HOLTON
 Professor WILLIAMS
 Professor ANDREWS
 Professor PETERSON

Associate Professor EDWARDS
 Assistant Professor DAVIDSON
 Doctor HOLTZ

The courses in this department have for their controlling purpose the professional training of teachers. Two types of courses are offered: (1) courses that give the broad, fundamental principles upon which public education is based, and (2) courses that develop technique and skill in school management and the organization of the subject matter of the curriculum. All courses are based upon the proposition that education supported by public taxation should function in social and vocational efficiency.

The State Board of Education has set up the following standards for the certification of teachers:

1. Three-year Certificates Renewable for Life.
 - a. Complete four years of College work.
 - b. At least eighteen hours of the four years' work must be taken in the Department of Education, as follows: (1) Three semester hours in Psychology, three in Educational Administration, and three in Educational Psychology or Educational Sociology. (2) Nine semester hours elected from the Department of Education.
 - c. Credit obtained in college courses in the teaching of special subjects will be accepted to the extent of three semester hours to apply on the required credits in Education, provided that these courses are conducted with the approval of the College Department of Education and are offered in the junior or senior year, with preliminary preparation as follows:

English.—Not less than fifteen semester hours of college credit, following at least three high-school units.

Foreign Language.—Not less than fifteen semester hours of college credit in the language in which the teachers' course is taken, following at least three high-school units or equivalent in some foreign language or languages.

Mathematics.—Not less than fifteen semester hours of college credit, following at least two high-school units.

Physical Science.—Not less than ten semester hours of college credit in the science in which the teachers' course is taken, following at least two high-school units or equivalent in physical science.

Biological Science.—Not less than ten semester hours of college credit in the science in which the teachers' course is taken, following at least two high-school units or equivalent in biological science.

History.—Not less than ten semester hours of college credit, following at least two high-school units or equivalent.

In any of the above, six hours of college credit will be regarded as the equivalent of one high-school unit.

- d. Valid in any elementary school or high school in Kansas.
2. Three-year Certificates Renewable for Three-year Periods.
 - a. Complete at least two years of College work, including three semester hours in Psychology, three in Educational Ad-

ministration, and three in Methods of Teaching or equivalent courses in the Department of Education which may be acceptable to the State Board of Education.

- b. Valid in any elementary school, junior high school or high school offering not more than a two-year course of study.
3. Certificates for Teachers and Supervisors of Public-school Music.
 - a. Complete at least two years of College work, including the following:
 - (1) Not less than twenty-eight semester hours in technical courses in Music.
 - (2) Three semester hours in Psychology, three in Educational Administration, and three in Methods of Teaching.
 - (3) Not less than eight semester hours in Methods of Teaching Public-school Music.
 - b. Valid for three years and may be renewed for three-year periods.
4. Certificates for Teachers and Supervisors of Physical Education.
 - a. Complete at least two years of College work, including the following:
 - (1) Not less than twenty-eight semester hours in the Department of Physical Education.
 - (2) Three semester hours in Psychology, three in Educational Administration and three in Methods of Teaching.
 - b. Valid for three years and may be renewed for three-year periods.
5. Certificates for Teachers and Supervisors of Manual Training.
 - a. Complete at least two years of College work, including the following:
 - (1) Not less than twenty-eight semester hours in the Department of Shop Practice.
 - (2) Three semester hours in Psychology, three in Educational Administration, and three in Methods of Teaching.
 - b. Valid for three years and may be renewed for three-year periods.
6. Certificates for Teachers of Vocational Agriculture.
 - a. Complete four years of College work, including the following:
 - (1) Not less than forty-two semester hours in technical agriculture.
 - (2) Eighteen semester hours in the Department of Education: viz., three in Psychology, three in Educational Administration, three in Educational Sociology, three in Agricultural Education, three in Special Methods in Agriculture, and three in Supervised Observation and Teaching.
 - b. Valid for three years and may be renewed for life.
7. Certificates for Teachers of Vocational Home-making.
 - a. Complete four years of College work, including the following:
 - (1) Thirty-four semester hours in technical home economics, as required in the curriculum in Home Economics, and six semester hours of electives; viz., three semester hours in Child Welfare, and three semester hours in Practice Work in Household Management.
 - (2) Eighteen hours in the Department of Education; viz., three in Psychology, three in Educational Administration, three in Educational Sociology, three in Home Economics Education, three in Special Methods in Home Economics, and three in Supervised Observation and Teaching.
 - b. Valid for three years and may be renewed for life.

COURSES IN EDUCATION

FOR UNDERGRADUATES

Psychology A, B, C, and D are parallel courses in introductory psychology. The content in these courses is fundamentally the same, but the emphasis differs according to the preparation and needs of the various groups of students as indicated below.

101. PSYCHOLOGY A. Freshman or sophomore year, second semester. Class work, three hours. Three semester credits. Required for three-year state certificate. Professor Peterson.

This is an introductory course in psychology for teachers. It consists primarily in a study of the nature of the learning process and of the conditions and methods of study which favor the most rapid and effective progress in learning. The distribution and significance of individual differences and other related topics also receive attention.

102. PSYCHOLOGY B. Freshman year, first semester. Class work, three hours. Three semester credits. Required for state teachers' certificate in music. Professor Peterson.

This is an adaptation of course 101 to the special needs of music teachers. Less time is devoted to the study of learning and some attention is given to the analysis of musical ability into its elemental capacities. A study is made of the methods of measurement of some of these capacities.

103. PSYCHOLOGY C. Junior year and elective, first or second semester. Class work, three hours. Three semester credits. Required for state life certificate. Professor Peterson.

The aim of this course is to give a fair acquaintance with the more fundamental facts and problems of the entire field of psychology and with the methods by which new facts are ascertained and evaluated. Special attention is given to the psychological factors which directly influence personal efficiency.

104. PSYCHOLOGY D. Junior or senior elective, both semesters. Class work, three hours. Three semester credits. Professor Peterson.

This course is essentially similar to course 103, but more attention is given to those phases of individual and applied psychology which bear directly on the practical problems of daily life. Students in agriculture, engineering, and industrial journalism who desire some work in psychology should enroll in this section.

105. EDUCATIONAL ADMINISTRATION A. Elective, first or second semester. Class work, three hours. Three semester credits. Required for state teachers' certificate. Professor Andrews.

This course is a study of the organization of state, city and county school systems, with special emphasis upon rural and vocational schools; the interrelation of the functions of boards of education, superintendents, principals, teachers. Study of the school law of Kansas is an important part of the course.

106. EDUCATIONAL ADMINISTRATION B. Elective, first or second semester. Class work, three hours. Three semester credits. Professor Williams.

This course is similar to 105 in the general principles of educational administration in a democracy, but differs from it in that it gives special emphasis to the administration and supervision of vocational agriculture, homemaking, and trades and industry. Students preparing to teach these subjects should take this course rather than 105.

109. **EDUCATIONAL PSYCHOLOGY.** Elective, first or second semester. Class work, three hours. Three semester credits. Required for state teachers' certificate. Prerequisite: Psychology. Professor Peterson.

The course deals with those aspects of psychology that have a direct bearing upon educational practices. Attention is paid to the results of experimental investigations in the field. Instruction is by lectures and library work.

113. **HISTORY OF EDUCATION A.** Elective, first or second semester. Class work, three hours. Three semester credits. Professor Andrews.

This course is intended to present the successive relationships that have existed between educational machinery and practices, and the changing political, economic, scientific, cultural and ideal environments from primitive times to the present.

118. **EDUCATIONAL SOCIOLOGY A.** Elective, first or second semester. Class work, three hours. Three semester credits. Professor Holton.

This course deals with the concrete objectives of education considered as a process of social adjustment; the meaning of education in a democracy; the educative functions of the home, the community, the church and the school; the school as a special environment; the meaning of labor and leisure; cultural and vocational education; intellectual and practical studies; and physical and social studies.

119. **EDUCATIONAL SOCIOLOGY B.** Elective, first or second semester. Class work, three hours. Three semester credits. Professor Holton.

This course is similar to course 118 in general principles of education in a democracy, but differs from it in that it deals with the concrete objectives in vocational agriculture, homemaking, and trades and industry. Students preparing to teach these subjects should take this course rather than course 118.

122. **HOME ECONOMICS EDUCATION.** Elective, first or second semester. Class work, three hours. Three semester credits. Required of all candidates for state teachers' certificates who are preparing to teach home economics. Prerequisite: Foods I and II, Clothing I and II. Associate Professor Edwards.

This course considers problems dealing with the place of home economics in modern secondary education; the aims and the organization of the work in various types of schools; the administration, maintenance, equipment and supervision of departments of home economics. Special attention is paid to Kansas conditions.

126. **AGRICULTURAL EDUCATION.** Elective, first semester. Class work, three hours. Three semester credits. Required of all candidates for state teachers' certificates who are preparing to teach agriculture. Prerequisite: Educational Administration. Professor Williams or Assistant Professor Davidson.

A comparative study is made of the provisions for agricultural education in Kansas and other states and countries and of the principles underlying such education. The part played in agricultural education by community, county, state and nation is discussed. Types of schools, courses of study, adjustment of school work to community needs, and the equipment and administration of agricultural schools are studied. The aim of the course is to fit the student to plan, teach and administer or supervise agricultural work, especially in high schools.

130. **INDUSTRIAL EDUCATION.** Elective, first semester. Class work, three hours. Three semester credits. Expected of all candidates for state teachers' certificates who are preparing to teach manual training, shop work, trade courses, and other industrial subjects. Prerequisite: Educational Administration. Professor Williams.

This course is a study of typical secondary schools of industrial education and departments of industrial education in public schools; of the industrial schools of Germany and other foreign systems; of the making of a course of study in industrial education for secondary schools; and of shop equipment and costs.

132. SPECIAL METHODS IN THE TEACHING OF HOME ECONOMICS. Elective, first or second semester. Class work, three hours. Three semester credits. Expected of all candidates for state teachers' certificates who are preparing to teach home economics. Prerequisites: Foods I and II, Clothing I and II, and Psychology. Associate Professor Edwards.

This course applies the principles of sound teaching to the selection and development of the subject matter of home economics in lessons for high-school pupils and to the conduct of laboratory and classroom exercises. It is supposed to accompany course 141.

136. SPECIAL METHODS IN THE TEACHING OF AGRICULTURE. Elective, second semester. Class work, three hours. Three semester credits. Required of all candidates for state teachers' certificates who are preparing to teach agriculture. Prerequisite: Psychology. Professor Williams or Assistant Professor Davidson.

Training in planning lessons, organizing materials, and conducting class and laboratory work in agriculture is the purpose of this course. The work includes observation, criticism, and reports of class exercises, a study of work done in high schools, and the making and criticism of lesson plans and outlines. Special attention is given to the selection of laboratory materials, the supervision of laboratory exercises, and the adaptation of class and laboratory work to each other.

140. SPECIAL METHODS IN THE TEACHING OF INDUSTRIAL ARTS SUBJECTS. Elective, second semester. Class work, three hours. Three semester credits. Expected of all candidates for the state teachers' certificate who are preparing to teach industrial subjects. Prerequisites: Mechanical Drawing II, Woodworking II, and Educational Psychology. Professor Williams.

The various lines of work included under the head of industrial arts are studied and a series of progressive lessons worked out in each of these lines emphasizing important elements. A study is made of the various materials employed and the methods of utilizing them for the needs of pupils. The arrangement of courses, the outlines and presentation of assignments, the preparation of assignments, the preparation of laboratory material and the conduct of laboratory exercises are taken up. The work includes recitations, class discussions, assigned readings, and written reports.

141. SPECIAL METHODS IN THE TEACHING OF PHYSICS. Elective. Class work, two hours; laboratory, three hours. Three semester credits. Professor Raburn.

(See Department of Physics, course 224.)

142. SPECIAL METHODS IN THE TEACHING OF MATHEMATICS. Elective. Class work, three hours. Three semester credits. Associate Professor Stratton.

(See Department of Mathematics, course 122.)

143. SPECIAL METHODS IN THE TEACHING OF HISTORY. Elective, first or second semester. Class work, two hours. Two semester credits. Professor Iles.

(See Department of History, course 127.)

144. SPECIAL METHODS IN THE TEACHING OF ENGLISH. Elective, second semester and summer school. Class work, three hours. Three semester credits. Professors Searson and Davis.

(See Department of English, course 134.)

160. SUPERVISED OBSERVATION AND TEACHING IN HOME ECONOMICS. Elective, first or second semester. Three semester credits. Prerequisites: Foods I and II, Clothing I and II, and Special Methods in the Teaching of Home Economics. Associate Professor Edwards.

Students whose qualifications are accepted for this course will serve as teachers of sewing and cooking in the classes of the junior high school of Manhattan.

161. SUPERVISED OBSERVATION AND TEACHING IN AGRICULTURE. Elective, first or second semester. Three semester credits. Expected of all candidates for state teachers' certificates who are preparing to teach agriculture. Prerequisite: Educational Psychology. Assistant Professor Davidson.

Students expecting to teach take this work as a part of the regular class in the School of Agriculture. The work is supervised by a member of the Department of Education and by the regular class teacher. Both teachers criticise lesson plans and presentation.

162. SUPERVISED OBSERVATION AND TEACHING IN INDUSTRIAL ARTS. Elective, first or second semester. Three semester credits. Expected of all candidates for state teachers' certificates who are preparing to teach industrial arts. Prerequisite: Educational Psychology. Professor

Industrial classes conducted by experienced teachers are visited and careful observations are made in regard to sequence of courses, methods of presentation, interest, class order, and other phases of class work. Reports are presented on this work for discussion. Students are assigned teaching work under careful supervision, results are noted and suggestions are made for individual improvement.

180. RELIGIOUS EDUCATION A. Elective, first semester. Class work, three hours. Three semester credits. Doctor Holtz.

The controlling purpose of the courses in religious education is the preparation of teachers for Sunday schools. The need for better prepared teachers and for better teaching is recognized by everyone who is familiar with the work of the Sunday schools.

This course comprises a study of the origin of the Bible; the Bible as a social inheritance; the Old Testament history with special emphasis upon the social message of the prophets; the New Testament with attention given to the social teachings of Christ.

182. RELIGIOUS EDUCATION B. Elective, first semester. Class work, three hours. Three semester credits. Doctor Holtz.

The fundamental instincts, the physiological and psychological characteristics of the various stages of development, and the best methods of moral and religious instruction suited to these stages are studied in this course.

184. RELIGIOUS EDUCATION C. Junior or senior, elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Psychology. Doctor Holtz.

A study is made of the recognized principles underlying modern religious education; the organization of Sunday schools, the subject matter best adapted to each department of the organization; and the application of modern methods of teaching.

FOR GRADUATES AND UNDERGRADUATES.

201. RURAL EDUCATION. Elective, first or second semester. Class work, three hours. Three semester credits. Prerequisite: Educational Administration. Professor Holton or Professor Williams.

This course deals with extension education, boys' and girls' club work, the problems of the rural high school, one-room schools, consoli-

dation, social centers, farmers' organization, and all forms of organized community life in the open country, in so far as they bear on the problems of public education. A certain amount of field work is required in connection with the course.

211. MENTAL MEASUREMENTS. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Educational Psychology. Professor Peterson.

The course is designed to give a working knowledge of the fundamental principles of mental measurement and an appreciation of the significance of the measurement movement in education. A careful study is made of standard tests and scales for the measurement of mental capacity and educational achievement, with special reference to their value in the improvement of classroom methods and conditions of learning. Considerable practice is given in the application of standard tests and scales and in the statistical treatment and interpretation of results.

213. ABNORMAL PSYCHOLOGY. Elective, senior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Psychology C or D. Professor Peterson.

This course is devoted mainly to a study of such manifestations of faulty integration of bodily activities and mental functions as are found in hysteria, dreams, hypnotism, trances, multiple personality, etc. Critical attention is also given to certain questionable concepts of abnormal psychology which are rampant in current literature and to prevalent practices in dealing with mental disorders.

215. APPLIED PSYCHOLOGY. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Psychology. Professor Peterson.

A study is made of the psychological conditions of personal, industrial and business efficiency as determined by observation and experiment in such special fields as advertising, salesmanship, employment, scientific management, etc. Special attention is given to the use of psychological tests in employment, vocational guidance, etc.

216. ADVANCED SYSTEMATIC PSYCHOLOGY. Elective, first or second semester. Class work, three hours. Three semester credits. Prerequisite: Psychology and Educational Psychology. Professor Peterson.

The fundamental problems, methods, and interpretations of general psychology are studied critically in this course.

217. EXPERIMENTAL PSYCHOLOGY OF THE HIGHER MENTAL PROCESSES. Elective, first or second semester. Class work, three hours. Three semester credits. Prerequisite: Advanced Systematic Psychology. Professor Peterson.

As an introduction to the types of problems encountered and to the basic methods of procedure essential to the analysis of the thought processes, a study is made of a few representative experiments in animal and sensorimotor learning. This is followed by a survey of the experimental literature on the higher mental processes with special attention to the more objective studies of problem-solving methods in the experimental analysis of the thought processes.

220. THE AMERICAN HIGH SCHOOL. Elective, first or second semester. Class work, three hours. Three semester credits. Professor Andrews.

The course considers the history of secondary education in America with reference to its historic background. The history of the secondary curriculum, the social function of the high school, its administration and the place and importance of each subject in the course of study will receive consideration.

221. **EXTENSION METHODS AND PROBLEMS.** Elective, second semester. Class work, two hours. Two semester credits. Professor Williams and members of the Extension Division.

The origin and development of extension work, its aim and purposes and relation to other general educational activities are briefly reviewed. The organization and administration of extension work under the Smith-Lever law and the part taken by colleges and the Department of Agriculture; types of extension work conducted by bankers, railroads, manufacturers, and other agencies; and future problems of extension work, are studied.

FOR GRADUATES

301 and 302. **EDUCATIONAL SEMINAR I AND II.** Open to candidates for the master's degree. First and second semester, respectively. Class work, two hours. Four semester credits on completion of both courses. Prerequisites: Psychology, and Educational Administration. Professor Holton and other members of the graduate faculty.

The work consists of lectures, reports, and class discussions. Each member of the seminar chooses a topic early in the term for special investigation. Preliminary reports are made to the class from time to time and the final results of the study are embodied in a carefully prepared report.

303. **EDUCATIONAL SOCIOLOGY C.** Open to candidates for the master's degree. Both semesters and summer session. Class work, three hours. Three semester credits. Professor Holton.

This course has for its purpose the discovery of the fundamental social objectives for the curricula in high schools and colleges.

306. **EDUCATIONAL ADMINISTRATION C.** Class work, three hours. Three semester credits. Associate Professor Andrews.

The subjects considered are: The financial basis of public education, formation of budgets, structure and administration of the curriculum, administration of vocational training, essentials of the elementary curriculum, use of standard tests and interpretation of data. The problems of supervision as they relate to promotion, retardation and failure are considered.

307. **HISTORY OF EDUCATION B.** Class work, three hours. Three semester credits. Associate Professor Andrews.

The purpose of the course is to show the intellectual background of history, to sketch rapidly the ethical and educational ideas of the ancient world, the Hellenization of the orient, the rise of Christianity and the development of the Renaissance. Political and social history is considered only to interpret the educational plan and purpose of the period. Finally, we consider the modern scientific spirit and the modern educational theories, purposes and ideals.

325. **RESEARCH IN EDUCATION.** Required of all candidates for the degree of Master of Science whose major work is in the Department of Education. First and second semesters. Hours of work and credit arranged in conference with the head of the department.

The problem selected for research and investigation must be approved by the Graduate Council.

English

Professor SEARSON*
 Professor DAVIS
 Professor CONOVER
 Associate Professor BURNS
 Associate Professor RICE
 Assistant Professor HEIZER
 Assistant Professor MATTHEWS

Assistant Professor RUSSEL
 Instructor FULLER
 Instructor BOWER
 Instructor STURMER
 Instructor ELCOCK
 Instructor RUSHFELDT
 Instructor GARVEY

Ability to think well and to speak well, and capacity to appreciate the world's best literature, are recognized essentials of a liberal education. The work of the Department of English is to acquaint the student with the best standards of English practice and appreciation, and to encourage him to maintain these standards in all his work. To this end the department offers studies in cultural and technical English and special drills in expressing thought freely and effectively in matters touching the vital interests of the student. The study of the English language and literature is thus made the means of increasing the power and efficiency of the individual. It is therefore the aim of the department, in coöperation with the technical departments of the College, to increase the knowledge and effectiveness of the students.

COURSES IN ENGLISH LANGUAGE

FOR UNDERGRADUATES

101. COLLEGE RHETORIC I. Freshman year, both semesters and summer school. Class work, three hours. Three semester credits. Prerequisite: Three units of high-school English. Professors Searson, Davis, and Conover, Associate Professors Burns and Rice, Assistant Professors Heizer, Matthews, and Russel, Miss Fuller, Miss Bower, Miss Sturmer, Miss Elcock, Miss Rushfeldt, Miss Garvey.

After a series of tests to determine the fitness of the student to pursue the work of the course, a rapid, thorough review of the essentials of English is given, special attention being paid to sentence and to paragraph structure. This is followed by themes designed to develop the student's ability to tell accurately what he knows, to describe interestingly what he sees, and, above all, to enable him to relate the subject of English to the work which he expects to do in after-life. Texts: Greever and Jones, *Century Handbook of Writing*; Cunliffe and Lomer, *Writing of To-day*, first half.

104. COLLEGE RHETORIC II. Freshman year, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Professors Searson, Davis, and Conover, Associate Professors Burns and Rice, Assistant Professors Heizer, Matthews, and Russel, Miss Fuller, Miss Bower, Miss Sturmer, Miss Elcock, Miss Rushfeldt, Miss Garvey.

This course is a continuation of the work in College Rhetoric I. Special emphasis is laid on outlining and on expository and argumentative writing. Attention is directed to practical as well as to literary subjects for the frequent themes written throughout the course. Texts: Canby and others, *English Composition in Theory and Practice*; Cunliffe and Lomer, *Writing of To-day*, second half.

105. COLLEGE RHETORIC II.—SPECIAL PRACTICE. Freshman year, both semesters. Class work, three two-hour practice periods. Three semester credits. Prerequisite: College Rhetoric I. Professor Davis, Assistant Professor Matthews.

* Resigned June 2, 1921.

This course parallels the regular College Rhetoric II course, and is arranged to accommodate those students that show a special aptitude for writing and that expect to make writing in some form their profession. Admission to the course is by special permission only.

107. SPECIAL ENGLISH. Freshman year, both semesters. Class work, three hours. No credit. Professor Davis and Associate Professor Rice.

This course is a review of the essentials of English composition, accompanied by drills in sentence structure and in idiomatic expression, by special exercises and by consultations. It is required of any student assigned to College Rhetoric I who within the first few weeks of the work of that course shows that he is unable to express his ideas clearly and accurately. Textbook: Greever and Jones, *Century Handbook of Writing*.

110. ENGINEERING ENGLISH. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Professor Davis and Assistant Professor Matthews.

This is an advanced course in English particularly adapted to the needs of engineers. The general problems of engineering writing are discussed. Specific assignments are made in the writing of business letters relating to engineering, and in the preparation of technical manuscripts and reports. Essays of especial value to the engineer are read and analyzed. Texts: Watt, *The Composition of Technical Papers*; Aydelotte, *English and Engineering*.

113. ADVANCED COMPOSITION I. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Professor Conover.

In this course special emphasis is given to the subject of exposition. The subjects of the themes required are taken as far as possible from the student's particular field of work. Models of reports, explanations and general expository work are carefully studied. Text: Jelliffe, *Handbook of Exposition*.

116. ADVANCED COMPOSITION II. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Advanced Composition I. Professor Conover, Professor Davis.

Narrative writing is studied in this course, both in its relation to the other forms of composition and as an independent form. The practical forms of narrative are studied in detail, and attention is given to the short story. Text: Buck and Morris, *Narrative Writing*.

119. ARGUMENTATION AND DEBATE. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Associate Professor Burns.

This course includes a systematic study of the theory of debate; brief making; classroom practice in debating, in defending propositions, and in extemporaneous speaking; the proper method of collecting and classifying material; and effective methods of refuting arguments. Consultations, library investigations, and special group conferences form helpful laboratory features of the course. Text: Stone and Garrison, *Essentials of Argument*.

122. BUSINESS ENGLISH I. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professors Davis and Searson.

This course comprises a thorough review of business forms and general business writing, with special attention to business correspondence and special sales letters. A close study is made of the principles of effective writing as they are found applied in the best writing in the commercial world. Text: Gardner, *Effective Business Letters*.

123. BUSINESS ENGLISH II. Elective, second semester. Class work, three hours. Prerequisite: College Rhetoric II. Professors Davis and Searson.

This course is a continuation of Business English I. It includes a brief, thorough review of business forms, with special emphasis placed upon advanced business correspondence, sales letters, sales talks, and effective means of increasing sales turnovers. Wherever possible the work is given practical tests in business procedure. Text: ———.

125. ADVERTISING ENGLISH. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis.

This course offers a study of the principles of effective English as they are applied in present-day advertising writing. A preliminary survey of the principles of advertising is made in the early part of the course. Later actual practice is given in the writing and printing of the fundamental types of advertisements. Text: Hall, *Writing an Advertisement*.

128. ORAL ENGLISH I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Assistant Professor Heizer.

In this course a study of the principles of oral composition and practice in oral composition in the form of explanations, narrations, descriptions, selling and other business talks, travel talks, and speeches for special occasions are offered. For materials for the exercises given in class, students are directed to cultural subjects, more particularly to painting, sculpture, architecture, and music. Texts: Brewer, *Oral Composition*.

131. ORAL ENGLISH II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Assistant Professor Heizer.

This course is a continuation of Oral English I, but does not require it as a prerequisite. Attention is directed especially to the forms of oral English more commonly employed, such as conversation, the toast or after-dinner speech, introductions, nominations, announcements, presentations, and the like. For reading the students are directed to current magazines so as to be able to discuss current events of all kinds. Text: Brewer: *Oral Composition*.

134. METHODS OF TEACHING ENGLISH. Elective, second semester and summer school. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professors Searson and Davis.

This course is planned to meet the needs of those who are called upon to teach English in connection with the applied sciences. The course of study, the application of English instruction to life needs, and definite methods of motivating English instruction are specially considered. Text: Carpenter, Baker, and Scott, *The Teaching of English*.

137. AGRICULTURAL ENGLISH. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professors Davis and Conover.

This course consists of a rapid review of the essentials of English composition as applied in the business writing of the modern farmer. Business correspondence, bulletin writing, the organization of short business talks, and the basic principles of farm advertising are considered. The problems of writing that confront the county agent, the high-school teacher of agriculture, and the farm manager are made the subject of discussion and practice.

FOR GRADUATES AND UNDERGRADUATES

201. FARM ADVERTISING. Elective, first semester. Class work and practice, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis.

How to advertise all kinds of farm produce in order to secure regular customers by parcel post or by direct delivery is the object of this course. The student is shown how to write the most effective copy for "display ads.," "story ads.," and handbills, and how to feature the central point in each advertisement. The course includes the collection of the most important facts concerning farm produce and such study of markets and marketing as is necessary. Text: Starch, *Advertising*.

204. FARM BULLETINS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Professor Davis.

In this course the student is required to make an extensive study of farm bulletins and the essentials of writing good bulletins. How to write in a simple, direct style that appeals to the readers for whom the bulletin is intended is the subject of careful study. Current farm bulletins are made the basis for the work. The student is permitted to take the facts he has collected in connection with the work of other classes and to use them in working out special reports required in this course. The course is designed especially for those who intend later to write farm bulletins.

207. TECHNICAL WRITING. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: One of the following courses: 113, 116, 122, 125, 201, 204. Professors Davis and Conover.

This course is planned to help students properly to record and to report technical work. Fundamental principles of technical writing are studied in connection with such practice as will necessitate clearness, accuracy, and effectiveness. Text: Watt, *The Composition of Technical Papers*.

251. THE SHORT STORY. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Associate Professor Rice.

Practice in writing short stories, based upon thorough study of the world's best short stories, is offered in this course. The principles which underlie the material and structure of the short story—plot, setting, action, and character analysis—are especially emphasized. Text: Esenwein, *Writing the Short Story*; Ashmun, *Modern Short Stories*.

254. COMMUNITY ENGLISH. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Literature I. Professor Searson and Assistant Professor Heizer.

This course comprises the study and practice of the English work most needed in the activities and recreations of community life. A detailed study is made of the pageant. The class is organized as a special group and its members are trained in the various forms of procedure that may be required in the rural community. Text: Bates and Orr, *Pageants and Pageantry*.

FOR GRADUATES

301. HISTORY OF LANGUAGE I. Elective, first semester. Class conference, two hours. Two semester credits. Prerequisite: English Literature II. Professors Searson and Conover.

This course offers a study of the origin and development of the English language. Special emphasis is placed on Old English. Texts: Wyld's *Historical Study of the Mother Tongue* and Bright's *Anglo-Saxon Reader*.

302. HISTORY OF LANGUAGE II. Elective, second semester. Class conference, two hours. Two semester credits. Prerequisite: English Literature II. Professors Searson and Conover.

This course is a continuation of History of Language I. Special emphasis is placed on Middle English and Modern English. Texts: Wyld's *Historical Study of the Mother Tongue* and Emerson's *Middle English Reader*.

304. RESEARCH IN APPLIED ENGLISH. Elective, second semester. Class conference, two hours. Two semester credits. Prerequisite: History of Language II. Professors Searson and Davis.

Individual assignments are made in the fundamental fields of research in applied English. The student is required to carry on an original investigation and to make an acceptable report of his research work.

COURSES IN ENGLISH LITERATURE

FOR UNDERGRADUATES

171. ENGLISH LITERATURE I. Sophomore year, both semesters and summer school. Class work, four hours. Four semester credits. Prerequisite: College Rhetoric II. Professors Searson, Davis, and Conover, Associate Professors Burns and Rice, Assistant Professors Heizer, Matthews and Russel, Miss Fuller, Miss Bower, Miss Sturmer, Miss Elcock, Miss Rushfeldt, Miss Garvey.

In this course the students are made familiar with the principles of literary appreciation and are taught to apply them to selected texts in narrative, lyric and dramatic poetry, as well as in fiction, the essay, and the oration. The work of the course is intensive, notebooks are kept, and frequent tests are given. Texts: Heydrick, *How to Study Literature*, and Cunliffe, Pyre, and Young, *Century Readings in English Literature*.

174. ENGLISH LITERATURE II. Sophomore year, both semesters and summer school. Class work, four hours. Four semester credits. Prerequisite: English Literature I. Professors Searson, Davis, and Conover, Associate Professors Burns and Rice, Assistant Professors Heizer, Matthews and Russel, Miss Fuller, Miss Bower, Miss Sturmer, Miss Elcock, Miss Rushfeldt, Miss Garvey.

This course presents history of English literature by means of lectures and of discussions of the text. Extensive assignments in reading are made, and reports are given in class. Weekly tests are required. Texts: Long, *English Literature*, and Cunliffe, Pyre, and Young, *Century Readings in English Literature*.

177. ENGLISH LITERATURE HE-I. Sophomore year, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis, Associate Professor Rice, Assistant Professors Heizer and Russel, Miss Bower, Miss Sturmer, Miss Elcock.

This course offers in slightly condensed form the work given in course 171. Texts: Heydrick, *How to Study Literature*, and Cunliffe, Pyre, and Young, *Century Readings in English Literature*.

180. ENGLISH LITERATURE HE-II. Sophomore year, both semesters. Class work, three hours. Three semester credits. Prerequisite: English Literature HE-I. Professor Davis, Professor Conover, Assistant Professors Heizer and Russel, Miss Bower, Miss Sturmer, Miss Elcock.

This course presents a history of English literature in much the same way as course 174. The amount of reading required is slightly less. Texts: Long, *English Literature*, and Cunliffe, Pyre, and Young, *Century Readings in English Literature*.

FOR GRADUATES AND UNDERGRADUATES

271. THE ENGLISH BIBLE I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professor Searson.

This course familiarizes the student with the different kinds of literature found in the English Bible. A careful study is also made of the style of that great classic in order to discover the secrets of its simplicity, clearness, and power. Text: Moulton, *Short Introduction to the Literature of the Bible*.

272. THE ENGLISH BIBLE II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professor Searson.

This course, while being a continuation of The English Bible I, is in itself an independent unit and does not require The English Bible I as a prerequisite. Text: Moulton, *Modern Reader's Bible*.

274. THE SHAKSPEAREAN DRAMA. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professor Searson and Miss Sturmer.

This course includes a study of Shakspeare's life and times and the reading of ten of his greatest plays. Text: Boas, *Shakspeare and His Predecessors*.

275. EIGHTEENTH CENTURY LITERATURE. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature II. Professors Davis and Conover.

This course includes a study and discussion of the leading literary movements of the eighteenth century. Important representative works are read and are made the subject of class reports and discussions.

277. NINETEENTH CENTURY LITERATURE. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature II. Professor Davis and Professor Conover.

In this course there is discussion of the literary movements found throughout the century, especially in the Victorian period. Significant works are read and are made the subjects of class reports and discussions. Text: Saintsbury, *Nineteenth Century Literature*.

280. AMERICAN LITERATURE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professor Davis and Associate Professor Rice.

The course consists of lectures on the history of American literature and of class reports on assigned readings. A special study is made of the standard works of the chief American authors. Text: Curtis Hidden Page, *Chief American Poets*.

282. CURRENT LITERATURE. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: English Literature I. Professor Conover.

It is the aim of this course to establish a definite basis or standard of literary criticism and appreciation by an inductive study of contemporary literature. The course includes a consideration of the best works of such literary figures as Tagore, Henry James, Maeterlinck, Galsworthy, Anatole France, Thomas Hardy, Tchekov, Bernard Shaw, Selma Lagerlof, Emile Verhaeren, Arnold Bennett, Stephen Phillips, Wm. Butler Yeats, J. M. Synge, Alfred Noyes, and the younger group.

286. THE NOVEL I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature II. Professor Conover and Assistant Professor Russel.

This course comprises a study of the English novel, including the discussion of its historical development, its relation to other forms of fiction, and its place in contemporary literature. Especial attention is given to representative works of modern writers, both English and American. Text: Cross, *The Development of the English Novel*.

287. THE NOVEL II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature II. Professor Conover and Assistant Professor Russel.

This course is a continuation of The Novel I. A review of the essentials in the study of the novel is given, and readings of representative modern novels are continued, with definite class reports.

288. ENGLISH SURVEY I. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature, or its equivalent. Professor Searson, Professor Davis.

This course offers an advanced study in the history of English literature. Beginning with Anglo-Saxon times, the course continues through the Middle English period down to the close of the Elizabethan period. Text: Garnett and Goss, *History of English Literature*, Vols. I and II.

290. ENGLISH SURVEY II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Survey I. Professors Searson and Davis.

This course is a continuation of English Survey I. It traces the rise of Puritanism and its influences on English literature. Emphasis is placed upon the classical movement. A brief survey is made of romanticism and its development. Text: Garnett and Goss, *History of English Literature*, Vols. III and IV.

291. WHITMAN AND DEMOCRACY. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature II. Professors Davis and Conover.

This course offers a study and interpretation of the most important works of Walt Whitman.

292. BROWNING. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professors Searson and Davis.

This course offers a study in the interpretation of the most important poetic and dramatic works of Robert Browning. Texts: Browning's *Complete Poetical Works* and Phelps' *Browning, How to Know Him*.

294. TENNYSON. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professors Searson and Davis.

This course offers a study in the interpretation of the most important poetic works of Alfred Tennyson. Texts: Tennyson's *Complete Poetical Works*, and Van Dyke's *The Poetry of Tennyson*.

295. THE ARTS AND CRAFTS MOVEMENT. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature, or its equivalent. Professor Conover.

This course takes as its basis the life of William Morris, and treats of the arts and crafts movement in its relation to literature. Works of Morris, Rosetti, Ruskin, and other writers of the same group are read and discussed. Text: Mackail's *Life of William Morris*.

296. THE NEW POETRY. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Literature II. Professors Crawford and Conover.

This course comprises a brief study of the new poetry movement, and includes a reading and study of the leading poetic creations and representative writers of new poetry. The course also includes some practice in the writing of poetry.

FOR GRADUATES.

310. THE ROMANTIC MOVEMENT I. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature. Professors Searson and Conover.

This course offers advanced work in the study of eighteenth century romanticism. Text: Beers, *A History of English Romanticism in the Eighteenth Century*.

313. THE ROMANTIC MOVEMENT II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature. Professors Searson and Conover.

This course continues throughout the Victorian period the work done in the preceding course. Text: Beers, *A History of English Romanticism in the Nineteenth Century*.

315. RESEARCH IN THE LITERATURE OF INDUSTRY. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature. Professors Searson, Davis, and Conover.

This is an investigation and research course based upon a careful study of the development of the distinctive literature of industry.

Entomology

Professor DEAN
Associate Professor MERRILL
Assistant Professor SMITH

Associate Entomologist MCCOLLOCH
Assistant HAYES

In all courses a special effort is made to make the student realize that he is studying living things which form a part of his daily environment, and upon which his welfare in many cases vitally depends. In courses in which both class and laboratory instruction is given, the closest correlation is striven for, and wherever possible the same form is studied simultaneously in laboratory and class. The student is led to integrate his classroom knowledge with local animal life by means of frequent and carefully planned field excursions and by the free use of vivaria in laboratory and museum. The courses offered are intended to awaken in the student a keen appreciation of the general principles underlying insect life, of the life economy of the more beneficial as well as the more injurious species, and of the general principles governing methods for their control.

Standard anatomical charts, a representative collection (especially of local species), a high-grade lantern for the projection of lantern and microscope slides, a large and excellent series of lantern slides (many of them colored), and a series of microscope slides are available for illustration. Compound and dissecting microscopes sufficient for the needs of laboratory classes have been provided.

Facilities for advanced work are provided for graduate students and others who expect to pursue the subject professionally. An advanced laboratory is equipped with individual desks, binocular microscopes, compound microscopes, rotary microtome, imbedded ovens, drawing apparatus, and a supply of glassware and reagents sufficient for histological work and for research. A well-equipped insectary is available for training in insectary methods. An air-conditioning machine in the insectary adds materially to the possibilities for experimental work. A field station with all the necessary equipment provides means for the study of insects under normal field conditions.

COURSES IN ENTOMOLOGY

FOR UNDERGRADUATES

101. GENERAL ENTOMOLOGY. Junior year and elective, both semesters and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: General Zoölogy I and II. Professor Dean, Assistant Professor Smith.

This is a study of the elementary anatomy and physiology of insects, complete enough to give a thorough understanding of the life history

and habits of the most important species and the general principles upon which the control of these economic forms is based. It is a study of the more important general facts about insects as a class; the main characters of the different orders and groups; how they survive and multiply; and how the structure and habits of one group render it susceptible to certain measures of control, while in other groups entirely different measures are necessary. The class work consists of lectures and of text and special reference study.

106. HOUSEHOLD ENTOMOLOGY. Elective, first semester. Class work, two hours. Two semester credits. Prerequisites: General Zoölogy I and II. Professor Dean.

This is a study of the elementary structure and physiology of insects, complete enough to give a clear understanding of the life history, habits, and methods of control of the principal insects injurious to house, garden, lawn, and human health. The course consists of reference study and a series of lectures.

111. APICULTURE. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Entomology. Associate Professor Merrill.

This course comprises a general study of the structure, life history, general behavior, activities, and products of the honeybee. Special attention is given to practical beekeeping, the best methods used among beekeepers being discussed. A study is made of bee diseases and of the standard methods to be used in their eradication and control. A study is also made of the relation of bees to agriculture and horticulture.

116. MILLING ENTOMOLOGY. Junior year, second semester. Class work, one hour. One semester credit. Professor Dean.

This is a study of the insect pests of flour mills, elevators, granaries, warehouses, and bakeries, and of the standard methods to be used in dealing with them. The course consists of lectures and special reference reading. Inspection trips are made to flour mills and warehouses.

FOR GRADUATES AND UNDERGRADUATES

201. HORTICULTURAL ENTOMOLOGY. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: General Entomology. Associate Professor Merrill.

This is a study of the most important insect pests of orchard, garden and forest, and of standard methods for controlling their ravages. The class work consists of lectures and the study of references.

206. GENERAL ECONOMIC ENTOMOLOGY. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Entomology. Professor Dean.

This is a study of the life economy of the more important economic insects, of methods to be used in dealing with them, and of the literature of economic entomology. The student is made familiar with our present knowledge of the most important of our injurious insects, with the sources of economic literature, and with methods commonly used in the investigation of problems in economic entomology. The class work consists of lectures, and of text and special reference reading.

Laboratory.—The laboratory work consists of the formation and study of a collection of injurious insects, and in insect breeding. This work naturally involves much field study, in the course of which the student gains a first-hand acquaintance with the more important injurious insects at home in nature.

211. INSECT MORPHOLOGY I. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Entomology. Assistant Professor Smith.

This course deals exclusively with the external anatomy of representative insects belonging to a number of orders. The types studied are selected so as to present the essentials of the structure of the exoskeleton and to afford a basis for the courses in taxonomy and for professional studies in hexapod morphology.

212. INSECT MORPHOLOGY II. Elective, first semester. Laboratory, nine hours. Three semester credits. Prerequisite: Insect Morphology I. Assistant Professor Smith.

This course is designed for those advanced students who desire more thorough preparation in the essentials of insect anatomy than is provided for in Insect Morphology I. More extensive studies of detailed external and internal anatomy are made and preparation is afforded for advanced work in taxonomy and research in morphology.

216. PRINCIPLES OF TAXONOMY. Elective, second semester. Lectures, one hour. One semester credit. Prerequisites: (1) For students taking Taxonomy of Insects I: General Entomology and Insect Morphology I. (2) For students taking Taxonomy of Vertebrates: General Zoölogy I and II. All students registering in either of the above-mentioned courses must also register for this course. Courses cannot be taken separately. Assistant Professor Smith.

This course of lectures deals with the fundamental principles of modern taxonomy. The following subjects are considered in detail: Systems of classification; terminology of taxonomic groups; criteria of species and genera, binomial nomenclature, pre-Linnæan and modern nomenclature; international code of zoölogical nomenclature, and other codes; law of priority; and modern tendencies in taxonomy.

217. TAXONOMY OF INSECTS I. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisites: General Entomology and Insect Morphology I. Students registering for this course must also register for the course in Principles of Taxonomy. Assistant Professor Smith.

This is a study of the general principles of the classification of representative insects. The purpose of the course is so to familiarize the student with the literature, methods and ideals of classification that he will be able to identify unknown forms and to pursue advanced taxonomic studies.

218. TAXONOMY OF INSECTS II. Elective, second semester. Laboratory, nine hours. Three semester credits. Prerequisite: Taxonomy I and Insect Morphology II. Assistant Professor Smith.

This course provides for a more comprehensive preparation in the field of insect taxonomy. At the discretion of the instructor, the work may be taken in such a way that either a broader acquaintance with insects and the principles of classification is afforded, or intensive work may be done on selected groups.

221. ADVANCED GENERAL ENTOMOLOGY. Elective, first semester. Class work, three hours. Three semester credits. The class work consists of lectures, assigned readings, and written reports. Prerequisite: General Entomology. Assistant Professor Smith.

The purpose of this course is to give the advanced student a comprehensive view of the broad biological aspect of the subject and an understanding of the relation of insects to the complex of environmental factors. The various subdivisions of entomology are correlated and used as a basis in the presentation of general principles as well as illustrating the problems of maintenance and the various ways in which insects have solved them. The course includes, in part, a detailed consideration of the following: Phylogeny of insects and their relatives; metamerism; reproduction; gynandromorphism; parthenogenesis; pædogenesis; polyem-

bryony; respiration; temperature; embryology; internal and external metamorphosis; metabolism; aquatic insects, their evolution, adaptations, and activities; regeneration; experimental work with insects; insect parasitism; color and coloration; insects in relation to other organisms; insect behavior; and geological and geographical distribution.

226. MEDICAL ENTOMOLOGY. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Entomology. Assistant Professor Smith.

The subject matter of this course deals with insects and other arthropods as transmitters and disseminators of disease, attention being confined to that phase of the subject which pertains to the health of man. Emphasis is placed on the various important species of insects which are related to disease, the pathogenic organisms and their relation to insects, and the preventive measures which have, up to date, proved most effective. Some attention is also given to the important theories which underlie this subject and to important investigations in progress at the present time.

Laboratory.—The laboratory work consists of a careful study of insects and other arthropods which may affect the health of man directly, and of those which may be instrumental in the dissemination of disease; also a study of the causative organisms of certain insect-borne diseases and the methods by which these organisms are transmitted.

228. ADVANCED APICULTURE. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: The regular course in apiculture, Entomology 111 or its equivalent. Associate Professor Merrill.

This course is a continuation of the regular course in apiculture. The primary object of this course is to make a detailed study of the principles of bee behavior, and how these are related to practices of good beekeeping, special attention being given to the different forms of the behavior exhibited by the bees throughout the different seasons of the year, and the beekeeping practices which should be adopted to conform to this behavior. Since it begins in the first semester, problems that apply particularly to that time of the year are taken up, such as preparation for wintering, feeding for winter, and winter protection. Observations are made on the merits and demerits of different systems of wintering. Extracting honey, preparing it for market, marketing, and other advanced subjects are studied.

230. INSECT HISTOLOGY. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: General Entomology and General Cytology. Assistant Professor Smith.

This course is designed primarily for students who expect to do technical work in entomology. The work of the laboratory consists of the application of those special methods of gross and microscopical technique which are applicable to insects; practice in the use of the various special methods of killing and fixing, clearing, sectioning, staining and mounting the various groups of insects and insect tissues afforded. A study of insect tissues constitutes an important part of the course. The lectures deal with the more general matters of technique and insect histology.

231. ENTOMOLOGICAL AND ZOÖLOGICAL LITERATURE. Elective, first semester. Lectures, one hour. One semester credit. Prerequisite: General Entomology. Assistant Professor Smith.

This course deals with the literature of entomology, special consideration being given to bibliographical works and their uses. Since the literature of entomology is, to a considerable extent, inseparably associated with that of zoölogy, the course is of equal importance to the students of both subjects. The course is designed primarily to meet the needs of advanced undergraduates and graduate students who are begin-

ning research work. General and special bibliographical sources, foreign and American scientific journals and serials, and the construction of special bibliographies according to approved methods constitute the chief subjects for consideration. All advanced students of entomology and zoölogy are expected to take this course.

236. ZOÖLOGY AND ENTOMOLOGY SEMINAR. Elective, both semesters. One two-hour session each week. One semester credit. Prerequisite: Consult seminar committee.

This course consists in the presentation of original investigations, reviews of papers appearing in current journals, summaries of recent advances in the various fields, and discussion of the various aspects of the fundamental problems of modern biology.

238. ENTOMOLOGICAL PROBLEMS. Elective, both semesters. Two to four semester credits. Prerequisites: Consult instructors. Professor Dean, Doctor Merrill, Doctor Smith, and Associate Entomologist McColloch.

Students having sufficient training may, with the approval of the head of the department, study a special problem in one of the following subjects: Insect life history, insect control, insect classification, apiculture, insects injurious to stored grain and milled products, household insects. Such work must be pursued under the direct supervision of some member of the departmental staff.

FOR GRADUATES.

316. RESEARCH IN ENTOMOLOGY. Advanced students having sufficient fundamental training may, with the approval of the head of the department, undertake original investigation in one of the following fields of entomology: taxonomy, morphology, economic entomology. Such work is pursued under the direct supervision of some member of the departmental faculty and the final results may, if of sufficient merit, be used to fulfill the thesis requirement for the master's degree. The special student may, if willing and capable, be drawn into the research work of the Agricultural Experiment Station during the summer vacation and receive training in the investigation of economic problems. Prerequisites: (1) For research in taxonomy and morphology: General Entomology, Insect Morphology I, Taxonomy of Insects I, and Cytology. (2) For research in economic entomology: General Entomology, General Economic Entomology, Insect Morphology I, and Taxonomy of Insects I. Professor Dean, Assistant Professors Merrill and Smith, and Associate Entomologist McColloch.

Geology

Professor NABOURS
Associate Professor NEWMAN

By use of abundant illustrative material, an effort is made to have the student realize that he is dealing with natural forces which intimately affect his own well-being and that of his fellows. The agencies that have made the earth what it is are observed and studied in the field. The purpose of these courses is to arouse in the student an appreciation of the general principles underlying the structure and formation of the earth.

Some charts, a series of lantern slides, a representative collection of fossils and minerals, and a surrounding country exhibiting considerable variety of hill and valley, limestone, glacial drift and sand dunes, are available for illustrative purposes.

COURSES IN GEOLOGY

FOR UNDERGRADUATES

101. DYNAMIC AND STRUCTURAL GEOLOGY. Elective, first semester. Class work, two hours; two field trips during the semester. Two semester credits. Professor Nabours.

This course consists of a brief study of the structure of the earth, and of the agencies by which rocks are formed or destroyed and by which the topographic features of the earth are produced. Text: *Introductory Geology*, by Chamberlain and Salisbury.

102. ENGINEERING GEOLOGY. Junior year and elective, second semester. Class work, two hours; laboratory, six hours. Four semester credits. Professor Nabours and Associate Professor Newman.

The class work consists of a study of the general principles of structural and dynamic geology, and of rocks in respect to their mineral composition, structural properties, changes in weathering, etc. It is given by lectures, textbooks and references.

Laboratory.—The laboratory work comprises the observation and description of such structural and dynamic features as the locality affords, and a study of the principal rocks and their mineral constituents.

FOR GRADUATES AND UNDERGRADUATES

201. HISTORICAL GEOLOGY. Elective, second semester. Class work, two hours; two field trips during the semester. Two semester credits. Prerequisites: Geology 101, Elementary Zoölogy, and General Botany, or equivalent. Professor Nabours.

This course takes up a brief study of the history of the earth as shown by the record in the rocks. Special emphasis is placed on the history of life as indicated by the fossils.

History and Civics

Professor PRICE
Professor ILES
Associate Professor JAMES

Assistant Professor PEINE
Instructor OREM

Training for citizenship, breadth of view, historic-mindedness, fairness of judgment and general culture are constant and specific aims of each course offered by the Department of History and Civics. As a result of the training received in these courses the student is better prepared to understand and appreciate the institutions in the midst of which he lives and of which he is a part. He is also prepared to act more wisely his part as a leader in good citizenship wherever his lot may be cast. In our modern age and self-governing nation, and in an institution supported by the state and Nation, it would seem to be the imperative duty of every student to secure specific training for wise and effective leadership in the governmental affairs of the state and Nation that are thus preparing him for life and its duties.

COURSES IN HISTORY

FOR UNDERGRADUATES

101. AMERICAN HISTORY I (or BEGINNINGS OF THE AMERICAN NATION). Junior and senior years, both semesters and summer school. Class work, three hours. Three semester credits. Professor Price.

This course gives special emphasis to the industrial phases of the origin and development of American nationality and democracy to the end of the War of 1812. It also includes our constitutional and political

development, especially with reference to origin, basis, cause, and effect. It aims to develop historic-mindedness; that is, training the student to put himself in the other fellow's place and understand fairly "the why." The European origin and background of American history, the evolution of colonial life, industries, and institutions; why we became an independent nation; our westward expansion; the establishing of nationality, and the development of government by the people, are phases definitely emphasized. Instruction is given by means of lectures, readings, and recitations, based on *An American History Notebook*, by R. R. Price.

103. AMERICAN HISTORY LECTURES. Elective, both semesters and summer school. Two one-hour lectures a week. No credit. No prerequisite. Professor Price.

This series of lectures follows the outline given in *An American History Notebook*, which is used as the basis for the work in American History I, American History II, and American History III. Therefore this course is directly helpful to students taking any one of the three courses named above. To students taking only one of the above-named courses, these lectures give some insight as to the content of the other two courses. Since *An American History Notebook* has been adopted by the State Text-book Commission for use in the schools of the state, these lectures are also directly helpful for any student who expects to teach American history either in the grades or in high school. Only those who are regularly assigned to this course are permitted to attend the lectures; and when the student is assigned, regular attendance is required. There are no recitations and no examinations connected with this course. Students are permitted to ask questions at the close of each lecture. The course is based on Price's *An American History Notebook*.

105. AMERICAN INDUSTRIAL HISTORY. Sophomore and senior years, both semesters and summer school. Class work, three hours. Three semester credits. Assistant Professor Peine.

This course traces the history of American agriculture, manufactures, and commerce with related activities from their colonial beginnings to the present. It includes a survey of the physical basis for American history, the growth of population and its expansion across the continent, and the reflection of these things on our industrial, social, and political life. European developments, especially the industrial revolution and the expansion of commerce, are studied for the light they throw on American history. Finally, throughout the course an attempt is made to trace the growth of our national industrial organization and its present-day aspects. This course is based on *Outlines of American Industrial History*, prepared by the department. A text, such as Coman's *Industrial History of the United States* or Bogart's *Economic History of the United States*, is required, and the student is held responsible (a) for the contents of his text and (b) for assigned library work and lectures.

121. ENGLISH HISTORY. Sophomore year, both semesters and summer school. Class work, three hours. Three semester credits. Not open for credit to students who offer English history for entrance; such students should take History 226 or some other three-hour College course in history. Associate Professor James.

This is a general survey of the whole field of English history with some emphasis on the modern period. It includes the outlines of political history and the essentials of English constitutional development. Special attention is given to the development of the empire, to the English background of American history, and to the industrial and social development of the English people. The work is based on Cross's *A Shorter History of England and Greater Britain*, with lectures and assigned readings.

126. CURRENT HISTORY. Freshman year, both semesters and summer school. Class work, one hour. One credit each semester. Open as elec-

tive for not to exceed a total of four semester credits. Associate Professor James.

The content of this course differs each semester from that of any other semester. The text for the course is a good weekly or monthly magazine, such as *The Independent*, *The Outlook*, *The Review of Reviews*, *Current History*, or *World's Work*, together with the daily papers and some library references. The course is so conducted as to give a wide outlook on the world of to-day, and a better understanding of the conditions and institutions in the midst of which we live. It includes a study of as much of the everyday essentials of American and foreign governments, of international relations, of international law, of biography, of industrial developments, and of history—suggested each week by the events of the week—as can be crowded into the one hour of the recitation period. It directs the student to good habits of news reading of the right sort.

127. TEACHERS' COURSE IN HISTORY. Elective, summer school. Class work, two hours. Two semester credits. Associate Professor Iles.

This is a seminar course of discussion based on Henry Johnson's *Teaching of History in Elementary and Secondary Schools*, together with Mace's revised work, *Method in History*, and supplemented by a study of the Report of the Committee of Seven, and of the Committee of Five on *History in the Secondary Schools*, and the Committee of Eight on *History in the Elementary Schools*. A critical examination is made of special books on methods in history and civics, such as Wayland's *How to Teach American History*, and of special articles in the *History Teachers' Magazine*. The different texts in history and civics are critically investigated as to points of excellence or weakness, including lectures on the content or viewpoint of each. Information is also given as to the best illustrative material and helps in the teaching of history and civics. The course reveals the evolution in the writing of history, and the growing importance of history and civics in the modern school curriculum, together with the improving viewpoint as to content of both the history and the civics courses.

FOR GRADUATES AND UNDERGRADUATES

202. AMERICAN HISTORY II (or WESTWARD EXPANSION AND SECTIONALISM). Elective, both semesters and summer school. Class work, three hours. Three semester credits. Professor Price.

This course concerns itself with the industrial conditions, the issues and the leaders of the middle period of our history, from the close of the War of 1812 to the Civil War. Among the subjects investigated are the industrial and political conditions in America in 1816; the Missouri Compromise; the antislavery agitation; the Webster-Hayne debate; South Carolina nullification; annexation of Louisiana, Florida, and especially Texas; the Mexican War, and the resulting preponderance of the slavery issue; the Compromise of 1850; the Kansas-Nebraska bill and the early Kansas struggle "to the stars through difficulties," including the various constitutions and the final admission to statehood; the origin of the Republican party; the election of 1860; and the events leading immediately to the secession of the Southern States. Instruction is by means of lectures, recitations, and readings, based on *An American History Notebook*, by R. R. Price.

203. AMERICAN HISTORY III (or THE NEW INDUSTRIAL AGE). Elective, second semester and summer school. Class work, three hours. Three semester credits. Professor Price.

This course opens with a review of the industrial conditions in America just before the Civil War; next a careful examination is made of the industrial effects of that war; finally a study of the political and constitutional history of the last half-century is made in the light of the industrial conditions and developments of the same period. Manufactures, commerce, and especially agriculture, are carefully examined, particularly

with reference to the South and West. The new developments in political parties and the new devices in self-government are carefully studied as to developments, cause, and present conditions. The new America, with its spirit of nationality, its emphatic self-government, and its new world power and responsibility, are studied especially in the light of the new industrial developments. Instruction is imparted by lectures, recitations, assigned readings, and special reports.

204. AMERICAN AGRICULTURAL HISTORY. Elective, first semester and summer school. Class work, three hours. Three semester credits. Assistant Professor Peine.

This course is intended primarily for students in the Division of Agriculture. It devotes itself chiefly to the history of American agriculture. The course starts with a study of European background and Indian beginnings. It traces and compares the agricultural development of New England, the South and the central colonies during the colonial period; then follows the westward movement into the prairie regions of the Mississippi valley, with the distinctive American developments in methods, live stock, and especially farm machinery. The course gives special consideration to the South with its cotton, to the Northwest with its wheat, to the Southwest with its live stock, and to the corn belt with its varied industries. A special study is made of the last quarter-century, when varied industries, more intensive farming, and the high cost of living are replacing extensive mining of the soil, with its remarkable era of low cost of living, its sudden accumulation of wealth, and its rapid development of civilization. The relation of all this to our own state is constantly kept in view. This course should be supplemented by the course in American Political History. Instruction is given by lectures and recitations, readings, and reports.

206. AMERICAN POLITICAL HISTORY. Elective, first semester. Class work, two hours. Two semester credits. This course is especially intended to supplement course 204 or course 105; it is not open for credit to students who have credit in course 202. Professor Iles.

This course gives the story of the origin, development, leaders, and function of political parties in America, and studies the issues and results of the more important presidential elections. It traces the growth of nationality and the development of self-government through American history, but with special reference to present tendencies. This is a very desirable course for any one who would understand and appreciate present political and governmental conditions and tendencies.

207. PAN-AMERICA. Elective, both semesters. Class work, two hours. Two semester credits. Associate Professor James.

The history, government, and industrial conditions of Canada, Mexico, and the South American nations, and the interrelations of each of these and the United States are studied in this course.

223. MODERN EUROPE (SINCE 1814). Sophomore and junior years and elective, both semesters and summer school. Class work, three hours. Three semester credits. Professor Iles.

This course traces the evolution of the modern European nations since 1814, with special attention to political organization, industrial development, and colonial expansion. Political problems and social and economic adjustments due to the Great War are included. Recitations, lectures, and assigned readings. Text: Hayes's *A Political and Social History of Modern Europe*, Vol. II., with special studies on the World War.

225. HISTORY OF THE HOME. Elective, second semester. Class work, three hours. Three semester credits. Miss Orem.

This course includes the history of the primitive family; the Hebrew family; the family life of the Greeks and of the Romans; and the history

of the home and family during the Middle Ages, including the influence of the Christian church. Next, the history of the English family in the seventeenth and eighteenth centuries and of the American colonial home is studied. This is followed by a study of the industrial revolution and its effects upon family life. Finally, the history of the family during the nineteenth century, the present situation and tendencies are examined. The course is based primarily on Goodsell's *History of the Family*, supplemented by lectures and special studies.

226A. MODERN ENGLAND AND THE BRITISH EMPIRE. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Entrance credit in English history or three hours College credit in history, preferably History 121. Associate Professor James.

This course begins approximately with the accession of the Tudors in 1485. Special emphasis is placed on the beginnings and growth of world empire, England's part in international affairs, the economic and social history of the British Islands, and the changes by which England's government has become a practical democracy. The work closes with a survey of England and her empire as they exist to-day with their part in the World War, together with the effects of that war on the British Empire. Instruction is by lectures, assigned readings, and reports.

228. IMMIGRATION AND INTERNATIONAL RELATIONS. Elective, second semester. Class work, two hours. Two semester credits. Professor Price.

The title of the course suggests its content. It includes a study of the causes and the effects—economic, social, and political—of the coming of the foreigner to our shores, including the colonial period, the middle period, and the period since our Civil War, with special reference to the recent changes both as to the character of the immigrants and as to the conditions in Europe and in America that affect the number and quality of immigrants. The second part of the course includes a clear survey of the important epochs in our diplomatic history. The entire course deals with subjects of greatest moment to our nation, especially since the World War, subjects that should be correctly understood by every citizen, but especially by those who are to be our leaders. The text for the first part of the course is Fairchild's *Immigration—A World Movement and Its American Significance*. The text for the second part is Latane's *From Isolation to Leadership*. This course is conducted by lectures, assigned readings, recitations, and reports.

COURSES IN CIVICS

FOR UNDERGRADUATES

151. AMERICAN GOVERNMENT. Junior and senior years, both semesters and summer school. Class work, three hours. Three semester credits. Associate Professor Iles.

This course in civics, or actual government, reviews definitely the fundamental principles and operations of our state and national governments, including the essential principles of constitutional law, but gives special emphasis to the actual present-day conditions and movements in our governmental and political life. Among the subjects especially studied are the initiative and referendum, suffrage and primary elections, the recall, city government and government of territories, the regulation of commerce, conservation of national resources, national defense, taxation and finance, the actual methods of congressional activity, and the function, organization, power, and importance of political parties in our government. The course is primarily based on Munro's *The Government of the United States*. Throughout this course special and definite attention is given to recent and current events in governmental activities.

158. COMMUNITY CIVICS. Elective, summer school. Class work, two hours. Two semester credits. Another hour of credit may be obtained

by a limited number of students who have time to devote to special problems. Professor Iles.

This course deals chiefly with the functions of government as manifested in community life. It is designed to afford a basis both in subject matter and in method for those teachers who desire to present civics in direct relation to individual welfare. The use of local material in teaching civics is illustrated and the structural side of government is reviewed as far as is necessary to show the means through which the functions are performed.

163. BUSINESS LAW I. Junior and senior years, both semesters. Class work, one hour. One semester credit. Assistant Professor Peine.

This course includes a careful study of the essential principles in the law of contracts, of sales, and of negotiable instruments. It should be followed by Business Law II. Text: Huffcut's *Elements of Business Law*.

168. BUSINESS LAW II. Elective, both semesters. Class work, one hour. One semester credit. Prerequisite: Business Law I. Assistant Professor Peine.

This course includes a careful study of the more fundamental principles of the law of agency, of insurance, of guarantee and damages; of partnership and corporations; of bailments, including common carriers; of torts, especially the law of negligence; and of patent rights. Text: Huffcut's *Elements of Business Law*, and the *Kansas Statutes*.

155. FARM LAW. Elective, both semesters. Class work, two hours. Two semester credits. Assistant Professor Peine.

This course outlines the following subjects as far as the time permits: *First*. The title to the farm—deeds, etc.; boundaries of the farm—fences, etc.; water rights, including irrigation; police power of the state—quarantine, destruction of diseased animals, pure food; live stock—liability of owner, trespassing animals, estrays. *Second*. Contracts, including hired help, etc.; farm crops and their ownership; renters; sales, including warranty, etc.; factors, or commission merchants; common carriers, such as railroads; insurance. The course is based on Bay's *Business Law*, supplemented by Green's *Law for the American Farmer*, and by the *Kansas Statutes*.

FOR GRADUATES AND UNDERGRADUATES

252. COMPARATIVE GOVERNMENT. Elective, first semester. Class work, two hours. Two semester credits. Professor Iles.

This course comprises a study of the leading features, especially with regard to administration, of certain European governments such as England, France, and Germany, and a comparison of essential features with government in the United States. It is planned to supplement and round out the course in American Government. Text: Macy and Gannaway's *Comparative Free Government* or Holt's *Introduction to the Study of Government*.

256. INTERNATIONAL LAW. Elective, second semester. Class work, two hours. Two semester credits. Associate Professor James.

This course includes a discussion of the fundamental principles of international law and international relations, and rights and obligations, public and private, in time of peace and in time of war, are studied, especially in the light of recent developments, such as the Hague conferences. Text: Stockton's *Outlines of International Law*.

Industrial Journalism and Printing

Professor CRAWFORD
Associate Professor ROGERS

Associate Professor KEITH
Instructor POLSON

The work in industrial journalism and printing is designed to accomplish two purposes: the preparation of students who expect to be leaders in industrial, economic, and social life to do occasional writing for newspapers and other periodicals on subjects of special interest; and the training of students fundamentally interested in journalism for positions on farm journals, newspapers and other publications, particularly where writing on agriculture and other industrial subjects is in demand. The instruction given in the courses considers the requirements of newspapers, agricultural papers, trade publications, and general magazines. The work comprises lectures, discussions, and practice. *The Kansas Industrialist*, the official paper of the College, is under the editorial and mechanical direction of the professor of industrial journalism and superintendent of printing. In it is published acceptable matter prepared by students. The office of *The Kansas State Collegian*, the student semi-weekly newspaper, is in the department practice room. *The Brown Bull*, a humorous magazine which has aroused much favorable comment among newspaper men, is published by students in the department. Students write also for general newspapers, farm journals, and other publications.

Attention is given to the mechanical side of the profession in the instruction in printing, two semesters of which are required of all students taking the curriculum in industrial journalism. Printing has been taught in the institution continuously since 1875—the longest period during which the instruction in the subject has been given in any American college. Practical work is done not only on *The Kansas Industrialist*, but in a wide variety of job printing for College departments.

The equipment for instruction in journalism and printing is that of a practical publishing and printing plant. The journalism work room contains typewriters, reference books, "morgue," and files of a large number of agricultural publications, newspapers, and trade journals.

The printing plant contains a linotype, a two-revolution cylinder press, a drum-cylinder press, three platen presses, two wire-stitching machines, two paper cutters, a folding machine, an interchangeable perforating and punching machine, a quantity of both display and body type, including some of the most modern faces, and a large amount of miscellaneous equipment. All power machines are driven by individual electric motors.

A large amount of timely agricultural and other information is furnished regularly to Kansas newspapers, farm journals, and other publications. Special assignments are covered for these periodicals, and special inquiries are answered.

COURSES IN PRINTING**FOR UNDERGRADUATES**

101. **PRINCIPLES OF TYPOGRAPHY I.** Freshman year, first semester. Class work, two hours; laboratory practice, three hours. Three semester credits. Associate Professor Keith.

The course comprises a study of the case, the point system, and the measurement of type and stock. The history of printing is presented and a study is made of the development of the various typographical styles. Practice is given in setting straight matter. Emphasis is laid on accuracy.

104. **PRINCIPLES OF TYPOGRAPHY II.** Freshman year, second semester. Class work, two hours; laboratory practice, three hours. Three semester credits. Associate Professor Keith.

The work of the preceding course is continued, a study being made of type faces and the typography of advertisements and head display. The principles of effective make-up are treated. The use of cost systems in printing offices receives attention.

108. **AD. COMPOSITION I.** Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: Principles of Typography II. Associate Professor Keith.

This course consists of a study of the principles of display and design as applied to newspaper and magazine advertisements. Practical work is given in setting ads. for magazines, and newspapers are studied and criticised.

111. **AD. COMPOSITION II.** Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Ad. Composition I. Associate Professor Keith.

This course is a continuation of Ad. Composition I. More complicated work is studied.

114. **JOB COMPOSITION I.** Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: Principles of Typography II. Associate Professor Keith.

In this course the differences in the requirements for job composition and ad. composition are emphasized. The proper selection of type faces, borders, and ornaments is considered. The work consists of setting jobs and locking them up for the pressroom.

118. **JOB COMPOSITION II.** Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Job Composition I. Associate Professor Keith.

In this course color work, tabular forms, and other complicated kinds of job work are studied.

122. **PLATEN PRESSWORK I.** Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: Ad. Composition I or Job Composition I. Associate Professor Keith.

This work consists of practical platen presswork under ordinary printing-office conditions. The student is taught to feed press and make ready the jobs, and is given instruction in selection of inks and the care of printing rollers.

126. **PLATEN PRESSWORK II.** Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Platen Presswork I. Associate Professor Keith.

This work is a continuation of Platen Presswork I. The student is given more advanced work in mixing inks and in color work.

131. CYLINDER PRESSWORK I. Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: Platen Presswork II. Associate Professor Keith.

In this course the student is taught the fundamentals for work on all kinds of cylinder presses. He is taught how to make the work ready and how to feed, and is given instruction in the general care and handling of cylinder presses.

136. CYLINDER PRESSWORK II. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Cylinder Presswork I. Associate Professor Keith.

This is a continuation of Cylinder Presswork I.

139. PRINTING PAPERS AND SUPPLIES. Elective, first semester, on permission of the instructor. Laboratory, six hours. Two semester credits. Associate Professor Keith.

This course is intended to give the student the fundamental knowledge necessary for the proper selection and efficient buying and handling of printing supplies. Practical work is also given in figuring and cutting stock for the pressroom.

FOR GRADUATES AND UNDERGRADUATES

201. PRINTING COST ACCOUNTING. Elective, second semester, on permission of the instructor. Class work, two hours. Two semester credits. Associate Professor Keith.

Cost-finding systems adapted to various sizes and kinds of printing plants are studied in detail in this course. The figuring of costs, the economical routing of work through the plant, the purchase of stock and other supplies, and other problems of management are treated. All books and records commonly kept in printing offices are studied.

COURSES IN INDUSTRIAL JOURNALISM

151. ELEMENTARY JOURNALISM. Sophomore year, first semester. Class work, two hours. Two semester credits. Miss Polson.

This course is intended to give the student practical experience in the fundamentals of news writing. Methods of obtaining news of various types, the writing of the lead, and the general styles of the news story are carefully considered.

157. INDUSTRIAL WRITING. Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Elementary Journalism. Miss Polson.

This course applies the principles of journalism to the treatment of industrial subjects, such as are found in agriculture, engineering, home economics, and more general scientific research. The work of the College and the Experiment Stations affords the basis for the study and practice.

164. AGRICULTURAL JOURNALISM. Junior year, both semesters. Class work, one hour. One semester credit. Associate Professor Rogers.

The course is intended to supply students in the curriculum in agriculture with sufficient knowledge of the principles of news writing, as applied to agriculture, to enable them to become occasional contributors to newspapers and farm journals. Much practice in agricultural writing is given in the course.

167. INDUSTRIAL FEATURE WRITING I. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Industrial Writing. Associate Professor Rogers.

This course takes up the feature story, with careful attention to both the informative and the entertaining type. The principles underlying

the feature story are applied to writing on agricultural and other industrial subjects. The demands of newspapers, farm journals, and general magazines for writing of this character are analyzed.

171. **INDUSTRIAL FEATURE WRITING II.** Junior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Industrial Feature Writing I. Associate Professor Rogers.

The course deals specifically with agricultural journals, trade journals, and other publications of highly specialized character. The writing which is done in the course is done for publications of these types, and the students are required to submit their material to editors. A beginning is made in the study of the desk work required on a technical journal, including the handling of copy, the use of illustrations, and the principles of make-up from the editorial standpoint.

179. **PRINCIPLES OF ADVERTISING.** Junior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Industrial Feature Writing I. Professor Davis, of the Department of English.

This course considers the fundamentals of advertising as a part of modern business. The study of the goods to be advertised, the analysis of the market, the psychology of advertising, the preparation of advertising copy, and other important matters are taken up. The student is required to make application of the principles brought out in the course.

154, 160, 175, 183. **JOURNALISM PRACTICE I, II, III, IV.** These courses comprise laboratory practice accompanying courses 151, 157, 167, 179. Sophomore and junior years. Six hours. Two semester credits for each course. Prerequisite for each semester is the work of all preceding semesters in Journalism Practice. Professor Crawford, Associate Professor Rogers, and Miss Polson.

The work in Journalism Practice follows closely the other courses in journalism with which it is taken. Students are required to gather news, both assigned and unassigned, and to write the stories in the department workroom. The College campus is divided into "runs," which the students must cover at regular intervals, and assignments are given at specific times. The work given is suited to the advancement of the student. As he progresses in his work he is required not only to obtain news and feature stories, but to edit copy, to read proof, to write heads, to prepare editorials, to select matter worthy of reprint, and to perform other duties required in newspaper and magazine offices. Emphasis is laid on popular treatment of industrial subjects. The instructor in charge gives the students training in looking up references and in handling technical subjects simply but accurately, and also makes specific criticism on the work done by the students.

FOR GRADUATES AND UNDERGRADUATES

251. **CIRCULATION AND ADVERTISING PROMOTION.** Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Industrial Feature Writing II. Professor Crawford.

This course deals with the business management of periodical publications. The building up of circulation and the soliciting of advertising receive special emphasis. Premiums and other plans for increasing circulation are discussed. The advertising agency, the circulation analysis, and the fixing of advertising rates are treated.

254. **COPY READING.** Senior year, first semester. Laboratory practice, six hours. Two semester credits. Prerequisite: Industrial Feature Writing II. Associate Professor Rogers.

The course continues the work begun in Technical Journalism, and gives practice in the work required of the copy reader, whether on a newspaper, an agricultural journal, or some other publication. A study is made of newspaper style and of magazine and book style, the distinc-

tion between the two being clearly pointed out. The writing of heads and titles and proof reading receive detailed attention. A large amount of copy is actually handled in class, and papers of various types are made up as practice assignments.

257. EDITORIAL PRACTICE. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Copy Reading. Professor Crawford.

The course deals not only with the writing of editorials suitable for farm papers, trade papers, and newspapers, but with the conduct of the editorial offices of a periodical publication. Students obtain instruction and practice in writing the matter commonly prepared by the editorial staff of a paper, including editorials, paragraphs, and exchange matter. The acceptance and rejection of contributions receive consideration. Editorial policies and their influence form the subject of careful discussion.

260. ETHICS OF JOURNALISM. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Circulation and Advertising Promotion. Professor Crawford.

The course treats ethics of journalism as exemplified in the use of contributed matter, in the work of the reporter or staff writer, in the editorial conduct of the paper, and in the handling of circulation and advertising. The Federal and state laws relating to periodical publications, to advertising, to libel, and to authors' rights, including the Federal law of copyright, are treated. The attitude of periodical publications on matters of ethics and law is observed at first hand by the students.

265. MATERIALS OF JOURNALISM. Elective, first semester. Class work, two hours. Two semester credits. Miss Polson.

This is a course intended primarily for the general student who desires to obtain a knowledge of the principal newspapers and magazines, and to be able to form judgments as to the accuracy and adequacy of news reports and other published matter. The materials handled by the publications, the methods of treatment, and the character of the editorial comment are carefully presented. Attention is given to the several types of journalism.

270. MAGAZINE FEATURES. Elective, second semester, on permission of the instructor. Class work, two hours. Two semester credits. Miss Polson.

The course is intended for advanced students who desire to prepare literary work suitable for publication in magazines. The matter of the courses is varied to suit the needs and desires of the students, emphasis being laid upon such types of magazine writing as members of the class wish to practice.

274. HISTORY OF JOURNALISM. Elective, first semester. Class work, two hours. Two semester credits. Professor Crawford.

The course deals with the history of journalism from its beginning and with the history of printing so far as this is concerned with periodical publications. Most of the time of this course is given to journalism in England, Canada and the United States, though some attention is given to publications of other countries. The differentiation of journalism in the nineteenth century, and the several types which arose because of this are the subjects of careful study. Particular attention is given to the fields of agricultural and trade journalism.

278. JOURNALISM SURVEYS. Elective, second semester. Laboratory work, six hours. Two semester credits. Professor Crawford.

This course comprises the careful investigation of the periodical reading matter of communities. The information obtained is carefully tabulated, and studies are made of the relation of the reading matter to the industrial, economic, social, and moral life of the communities.

282. COLUMN CONDUCTING. Elective, second semester. Class work, two hours. Two semester credits. Professor Davis of the Department of English.

The course deals with the conducting of the so-called column, humorous or semiserious. This affords opportunity for writing paragraphs, light verse, and similar material. Practice in writing humor constitutes the principal work of the course; but as a basis for this, studies are made of the humorous magazines and of humor in other periodicals.

286. CURRENT PERIODICALS. Elective, first semester. Class work, two hours. Two semester credits. Professor Crawford.

The course comprises a study of current periodicals of various types. Special emphasis is laid on the material that they contain and the nature of its appeal to the reader. It is a nontechnical course, intended to give general students some knowledge of the field of current periodical literature.

290. JOURNALISM FOR VOCATIONAL TEACHERS. Elective, summer school. Class work, four hours. Two semester credits. Associate Professor Rogers.

This course is offered to meet the demand of teachers who feel the need of special training in news gathering and editing to enable them to use effective publicity in connection with the work of their schools. How to write, edit, and publish a school paper, and how to write school news that will be acceptable to local papers, are taken up in the course. Several hundred newspapers and magazines received by the Department of Industrial Journalism afford practical news material. Careful attention is given to the publication of high-school papers, and problems of staff organization, editorial methods, business management, mechanical make-up, and faculty advice are discussed. A large number of high-school publications are available for use by students in the course. Actual practice on a model school paper is required of each student taking the work.

FOR GRADUATES

Special courses will be arranged to meet the specific needs and desire of individual graduate students. These courses will in general embody creative literary work or detailed research in specialized journalism.

Library Economy

Librarian SMITH
Associate Librarian DERBY

Reference Librarian DAVIS
Reference Assistant ST. JOHN

The Library supplements the work of every department of the College. It is a storehouse of knowledge for every student. It supplies information and the latest results of scientific research for every instructor. The Library is thus essential to the College, forming, as it were, a center from which its various activities radiate.

In order that the Library may perform its functions with the highest degree of efficiency it is necessary that instruction be given regarding its use. With this thought in mind a course is offered the purpose of which is to familiarize the student with scientific, up-to-date methods in the use of books and to acquaint him with the best general reference books as well as with standard works on various subjects. Placed at the beginning of his College course it should tend to increase largely his efficiency in study throughout the entire course.

COURSE IN LIBRARY ECONOMY

FOR UNDERGRADUATES

101. LIBRARY METHODS. Freshman year, both semesters. Class work, one hour. One semester credit. Associate Librarian Derby, Miss Davis, and Miss St. John.

The course consists of lectures on classification and arrangement of books in the Library; card catalogues; the principal works of reference, such as dictionaries, encyclopedias, atlases, and standard works in history, literature, economics, quotations, statistics, etc.; public documents and their indexes; indexes to periodicals, etc. Instruction is given, also, in methods of indexing current reading for purposes of future reference.

Mathematics

Professor REMICK
 Professor WHITE
 Associate Professor STRATTON
 Instructor HOLROYD

Instructor MCKITTRICK
 Instructor HYDE
 Instructor LEWIS

In an institution that stands as an exponent of the industrial type of education, mathematics should occupy an important place. Training in the exact science is valuable not only for its own sake but also on account of its manifold applications. On this basis the courses in mathematics are offered primarily with the following ends in view: (1) the attainment of mental power and accuracy in the interest both of general culture and special application; (2) the acquirement of facts and processes that will provide the student with an indispensable tool for further scientific and technical study.

COURSES IN MATHEMATICS

FOR UNDERGRADUATES

101. PLANE TRIGONOMETRY. Freshman year, first and second semesters. Class work, three hours. Three semester credits. Prerequisites: Plane geometry, and one and one-half years of high-school algebra. Professor Remick, Professor White, Associate Professor Stratton, Miss Holroyd, Miss McKittrick, Miss Hyde, and Mr. Lewis.

This course treats of the functions of acute angles, right triangles, goniometry, oblique triangles, practical problems. Text: Palmer and Leigh's *Plane and Spherical Trigonometry*.

104. COLLEGE ALGEBRA. Freshman year, both semesters. Class work, three hours. Three semester credits. Prerequisites: Plane geometry, and one and one-half years of high-school algebra. Professor Remick, Professor White, Associate Professor Stratton, Miss Holroyd, Miss McKittrick, Miss Hyde, and Mr. Lewis.

Elementary topics, functions and their graphs, quadratic equations are rapidly reviewed. The further treatment includes the subjects of complex numbers, theory of equations, permutations and combinations, partial fractions, logarithms, and determinants. Text: Rietz and Cragthorne's *College Algebra*.

107. COLLEGE ALGEBRA A. Freshman year, second semester. Class work, five hours. Five semester credits. Prerequisites: Plane geometry, and one year of high-school algebra. Professor Remick, Professor White, Associate Professor Stratton, Miss Holroyd, Miss McKittrick, Miss Hyde, and Mr. Lewis.

After a brief review of elementary subjects, a thorough treatment of quadratics, ratio, proportion, progressions, and the binomial theorem for positive exponents is given. The remainder of the course follows closely the chief content of course 104. Text: Rietz and Crathorne's *College Algebra*.

110. PLANE ANALYTICAL GEOMETRY. Sophomore year, first semester. Class work, four hours. Four semester credits. Prerequisites: Plane Trigonometry, and College Algebra. Professor White, Associate Professor Stratton, and Miss Hyde.

This course treats of coördinate systems, projections, loci, straight line, conics, parametric and empirical equations, with a discussion of the general equation of the second degree. Text: Tanner and Allen's *Brief Course in Analytical Geometry*.

113. CALCULUS I. Sophomore year, second semester. Class work, five hours. Five semester credits. Prerequisite: Plane Analytical Geometry. Professors Remick and White, and Associate Professor Stratton.

The usual topics of differential calculus are considered together with integration of standard forms, definite integrals, rational fractions, and integration by parts. This course contains problems closely related to the work of engineering students. Text: Phillip's *Differential and Integral Calculus*.

116. CALCULUS II. Junior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus I. Professors Remick and White, and Associate Professor Stratton.

In this division of the subject emphasis is laid upon the applied side. Problems involving areas, lengths, surfaces, and volumes are treated by processes of single integration. The idea of successive and partial integration is applied to areas, moments, centers of gravity, surfaces, volumes, etc. The types of differential equations which the student of engineering is most likely to meet with in his subsequent work are briefly discussed. Text: Phillip's *Differential and Integral Calculus*.

119. CALCULUS. Sophomore year and elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Analytical Geometry. Professors Remick and White.

This course is designed especially for students intending to teach secondary mathematics and for those interested in the natural sciences. It includes a brief treatment of the fundamental principles of both branches of calculus, practice with the standard formulas of differentiation and their application to geometry and mechanics. Integration of the usual elementary forms is followed by the idea of the definite integral and a few of the more important applications.

122. SPECIAL METHODS IN THE TEACHING OF MATHEMATICS. Elective, second semester. Class work, three hours. Three semester credits. Associate Professor Stratton.

As its name indicates, this course is intended primarily for those who are planning to teach elementary mathematics. Emphasis is given to pedagogical questions, with some reference to the historical course of development. A discussion of the best methods of teaching arithmetic, algebra, and geometry; a study of the report of prominent mathematical organizations, especially those of the international commission; a comparison of the curricula of different schools—these are some of the matters which receive attention. An examination is made of books and articles on the teaching of mathematics. The course proceeds by lectures, readings, and reports on assigned topics.

125. ANALYSIS OF STATISTICS. Elective, first semester. Class work, three hours. Three semester credits. Professor Remick and Associate Professor Stratton.

The special purpose of this course is to acquaint students of agriculture, who may have occasion to make use of statistical tables of various sorts, with the modern mathematical methods of treatment. Use is made of farm bulletins, agricultural reports, etc., by means of lectures, readings, and recitations.

128. MATHEMATICS OF BIOLOGY. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Analytical Geometry. Professor Remick.

Elements of differential and integral calculus, curve plotting, and determination of equations of curves, are here considered. The course is designed to meet the needs of students in biology and is taught largely by the lecture method.

131. INSTITUTIONAL ACCOUNTING. Elective, second semester. Class work, three hours. Three semester credits. Associate Professor Stratton.

This course treats of accounting for institutions such as colleges, schools, clubs, societies, industrial and social organizations. The practice work includes preparation for publication of statements of income and expenditure, balance sheets, treasurer's reports, financial data and statistics, and of the annual returns of net income required under the Federal income-tax law. A study is made of the mathematics of investments, the handling of endowment and trust funds, and the preparation of budgets. The work proceeds by lectures, discussions, written reports, and exercises.

134. ACCOUNTING PRACTICE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Elementary Bookkeeping. Associate Professor Stratton.

This course includes an analysis of the development and structure of bookkeeping methods, the accounts of single proprietors, partnerships and corporations, the construction of manufacturing and trading profit-and-loss accounts and balance sheets, the analysis of railroad reports and bank statements, including bankruptcy and receivership conditions. The course is designed to give the students power to analyze commercial accounts and statements.

FOR GRADUATES AND UNDERGRADUATES

201. DIFFERENTIAL EQUATIONS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus II. Professor Remick.

This course is designed for those who may wish to extend their study of mathematics beyond the usual first course in calculus, and also for those intending to take advanced work in physics, mechanics, or engineering. The various standard types of differential equations are considered, together with the usual applications. Text: Murray's *Differential Equations*.

204. METHOD OF LEAST SQUARES AND THEORY OF MEASUREMENT. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Calculus II. Professors Remick and White.

This course includes a study of the law of error based on the theory of probability and the probability curve; adjustments of observations by the method of least squares; development of precision measures; distribution of errors; and Gauss's method of substitution in the solution of normal equations. The solution of a number of problems is required.

207. SOLID ANALYTICAL GEOMETRY. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Plane Analytical Geometry, and Calculus II. Professor White.

The topics treated include coördinates of points in space and their transformations, and involve the usual discussion of lines and planes. The standard types of quadratic surfaces are considered together with their classification and principal properties. Text: Snyder and Sisam's *Analytical Geometry of Space*.

210. ADVANCED CALCULUS I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus II. Professor White.

This course considers primarily special topics in integral calculus, including various methods of integrating elementary forms, a discussion of definite integrals with attention to the gamma and beta functions, and applications to lengths and areas. Text: Byerly's *Integral Calculus*.

213. ADVANCED CALCULUS II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Advanced Calculus I. Professor White.

This is a continuation of course 210, including further applications to geometry and mechanics, a treatment of line, surface, and space integrals, and a discussion of elliptic integrals. Text: Byerly's *Integral Calculus*.

216. THEORY OF EQUATIONS. Elective, first semester. Class work, three hours. Three semester credits. Professor Remick.

The course presupposes familiarity with the elements of the classical theory of the subject and treats particularly the modern development based upon the ideas connected with substitution groups and leading to the discussion of the solution of the general algebraic equation from the standpoint of the Galois theory. Text: Cajori's *Modern Theory of Equations*.

FOR GRADUATES

301. THEORY OF FUNCTIONS OF A COMPLEX VARIABLE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Advanced Calculus II and Differential Equations. Professor Remick.

The usual line of topics is treated through lectures, discussions, and reports.

306. THEORETICAL MECHANICS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus II. Associate Professor Stratton.

It is assumed that the student entering upon this course is familiar with certain preliminary ideas found in textbooks on general physics, and the subject of mechanics is treated in its relation to mathematical analysis.

311. PROJECTIVE GEOMETRY. Elective, second semester. Class work, three hours. Three semester credits. Professor White.

This course includes a treatment of the fundamental forms, projective relations, point rows, and pencils of the second order, poles and polars, properties of conics, and involution.

316. ADVANCED DIFFERENTIAL EQUATIONS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Differential Equations. Professor Remick.

This is a continuation of course 201. It includes a treatment of special topics, such as the equations of Legendre, Bessel, and Ricatti, together with applications.

Military Training

F. B. TERRELL (Major Inf., U. S. A.), Professor of Military Science and Tactics
 L. C. DAVIDSON (Major Inf., U. S. A.), Associate Professor of Military Science and Tactics, Commandant of Cadets
 C. A. CHAPMAN (Major, Coast Artillery Corps, U. S. A.), Assistant Professor of Military Science and Tactics; in Charge of R. O. T. C. Coast Artillery Unit
 J. A. VAN FLEET* (Major Inf., U. S. A.), Assistant Professor of Military Science and Tactics
 C. N. JACKSON (First Lieut. Inf., U. S. A.), Assistant Professor of Military Science and Tactics
 G. W. BROWER (First Lieut. Vet. Corps, U. S. A.), in Charge of R. O. T. C. Veterinary Unit
 E. L. CLAEREN (Major, U. S. R.), Secretary
 BERNARD McCAREY (Master Sergt., U. S. A., Retired), Supply Sergeant
 M. M. COFFEE (First Sergt., Coast Artillery Corps, U. S. A.), Instructor
 FRANK CUMISKEY (First Sergt. Inf., U. S. A.), Instructor
 W. F. MCCLINTOCK (First Sergt., Artillery Corps, U. S. A.), Instructor
 JOHN MCGARRY (First Sergt. Inf., U. S. A.), Instructor
 S. A. WILSON (Sergt. Inf., U. S. A.), Instructor
 W. T. J. RYAN (Sergt. Medical Dept., U. S. A.), Instructor
 A. L. FELTENBERGER (Sergt. Inf., U. S. A.), Instructor
 ROY E. WILSON (Private First Class, C. A. C., U. S. A.), Mechanic
 C. W. FISHER (Private First Class, C. A. C., U. S. A.), Mechanic

Since this College is one of the beneficiaries of the act of Congress of 1862, military tactics is required in the College curricula. All young men of age, not physically disqualified, are required to take military training four full hours a week for two years. A student entering as a junior or above is held for military science for the time necessary to complete the remainder of his College course unless this period is reduced by credits accepted from another institution.

Requests for excuse from military science, or for postponement of the work, are acted upon by the President of the College. Such requests are presented through the student's dean, and the President obtains the advice of the commandant of cadets, who thoroughly investigates each case on its merits and makes his recommendation to the President. Requests based on physical condition must be accompanied by a recommendation made by the College physician. Students excused from military science on account of physical disability are assigned to an equivalent amount of some other College work instead. Students permitted to postpone military science for any reason are not thereby excused, but must make it up later.

The act of Congress of June 3, 1916, known as the national defense act, provides for the establishment in civil institutions of a Reserve Officers' Training Corps (R. O. T. C.).

The object of this provision is stated as follows:

"The primary object of establishing units of the Reserve Officers' Training Corps is to qualify, by systematic and standard methods of training, students at civil institutions for reserve officers. The system of instruction, herein prescribed presents to these students a standard measure of that military training which is necessary in order to prepare them to perform intelligently the duties of commissioned officers in the military forces of the United States, and it enables them to be thus trained with the least practicable interference with their civil careers.

"Units of the senior division may be organized at civil institutions which require four years of collegiate study for a degree, including State

* Transferred, February 1, 1921.

universities and those State institutions that are required to provide instruction in military tactics under the provisions of the act of Congress approved July 2, 1862, donating lands for the establishment of colleges where the leading object shall be practical instruction in agriculture and the mechanic arts, including military tactics.

"Units of the junior division may be organized at any other public or private educational institution."

An infantry unit, a coast artillery unit, and a veterinary unit of the Reserve Officers' Training Corps have been established in this College, the senior division consisting of men in the four years' College curricula and the School of Agriculture.

Members of the R. O. T. C. will receive the benefits mentioned below:

1. SENIOR DIVISION, BASIC COURSE (Freshmen, Sophomores, and School of Agriculture). Each student of these classes will be furnished with complete uniform, and equipment for his use during the course. The articles remain the property of the United States and must be accounted for and turned in by each student at the close of each college year. A deposit of \$15 as insurance against loss of uniforms is required of each student.

A six weeks' training camp is optional for this course.

2. SENIOR DIVISION, ADVANCED COURSE (students who have completed the two years' Basic Course). The student who continues in the R. O. T. C. after completing the Basic Course will receive the following benefits:

He will receive the uniform referred to above, on the same terms.

He will receive commutation of subsistence at the rate of 53 cents per day, provided he executes an agreement to complete the Advanced Course, or continue in the course during the remainder of his time in College, and to take the course in camp training during such period, prescribed by the Secretary of War. The camps referred to involve no expense on the part of the student. In addition, a complete summer uniform will be issued and he will be paid at the rate of one dollar per day for not to exceed six weeks, and five cents per mile to cover travel expenses.

After graduation he will be eligible for appointment by the President of the United States as a reserve officer of the Army, and if so appointed he may, under certain conditions, be appointed and commissioned as a temporary second lieutenant in the regular army for a period of six months, with pay at the rate of \$100 per month, with the usual allowances.

In order to elect the Advanced Course, R. O. T. C., a student must have the recommendation of the president of the College and the professor of military science and tactics.

The corps of cadets at present is organized as two battalions of infantry, four companies. A military band is also provided for, the members of which must be thoroughly trained in military tactics. Assignments to the military band are made upon recommendation of the bandmaster, who has charge of the technical instruction.

Officers and noncommissioned officers are selected from the students taking the Advanced Course, R. O. T. C., by the commandant of cadets,

with the approval of the president of the College. This selection is made from among those cadets who have been most studious and soldierlike in the performance of their duties, and the most exemplary in their general deportment. Commissions are given all officers, and these commissions are signed by the governor, the secretary of state and the adjutant-general of the Kansas National Guard, while warrants signed by the president of the College and the commandant of cadets are issued to the noncommissioned officers. Both are held during the good conduct of the recipient.

Students who are regularly enrolled in the advanced course of the senior division receive three semester credits of elective work toward graduation for each semester of military training taken beyond the basic course.

COURSES IN MILITARY TRAINING

Senior Division, R. O. T. C.

BASIC COURSES, INFANTRY

101. MILITARY SCIENCE A-I. Freshman year, first semester. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: None.

The work of this course is divided as follows:

(a) *Practical.* Physical drill; infantry drill; school of the soldier, squad and company in close and extended order; preliminary instruction, sighting, position and aiming drills, gallery practice, nomenclature and care of rifle and equipment.

(b) *Theoretical.* Theory of target practice (individual and collective), military organization; map reading; service of security; personal hygiene.

102. MILITARY SCIENCE A-II. Freshman year, second semester. Lectures, recitations and military drill, four hours a week. One semester credit. Prerequisite: Military Science I.

The work of this course is divided as follows:

(a) *Practical.* Physical drill; infantry drill; school of the battalion; ceremonies; manuals; bayonet combat; entrenchment; first-aid instruction; range and gallery practice.

(b) *Theoretical.* Lectures on military policy as shown by military history of the United States, and military obligation of citizenship; service of information; combat; Infantry Drill Regulations, to include the school of the company; camp sanitation for small commands.

103. MILITARY SCIENCE A-III. Sophomore year, first semester. Lectures, recitations and military drill, four hours a week. One semester credit. Prerequisite: Military Science II.

The work of this course is divided as follows:

(a) *Practical.* Same as 102 (a); combat firing.

(b) *Theoretical.* Infantry Drill Regulations, to include the school of the battalion and combat; Small Arms Firing Regulations; lectures as in 102 (b); map reading; camp sanitation and camping expedients.

104. MILITARY SCIENCE A-IV. Sophomore year, second semester. Lectures, recitations and military drill, four hours a week. One semester credit. Prerequisite: Military Science III.

The work of this course is divided as follows:

(a) *Practical.* The same as 102 (a); signaling; semaphore and first-aid; sand-table work; range practice.

(b) *Theoretical*. Lectures on recent military history; service of information and security; marches and camping.

ADVANCED COURSES, INFANTRY

109. **MILITARY SCIENCE A-V**. Junior year, first semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisites: Military Science IV.

This course is divided into—

(a) *Practical*. Duties consistent with rank of cadet officers or non-commissioned officers in connection with courses 101, 102, 103, and 104; military sketching; discipline and handling of men.

(b) *Theoretical*. Minor tactics; field orders; map maneuvers. Liaison, topography, military engineering.

110. **MILITARY SCIENCE A-VI**. Junior year, second semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisite: Military Science V.

The course is divided into—

(a) *Practical*. Same as course 109 (a).

(b) *Theoretical*. Minor tactics; map maneuvers continued; elements of international law; military law; sanitation.

111. **MILITARY SCIENCE A-VII**. Senior year, first semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisite: Military Science VI.

The course is divided into—

(a) *Practical*. Same as course 109 (a).

(b) *Theoretical*. Tactical problems; map maneuvers; proceedings of court-martial; gradual growth of principles of international law embodied in American diplomacy, legislation and treaties; psychology of war and kindred subjects; general principles of strategy to show relations between the statesman and the soldier; military engineering; company administration.

112. **MILITARY SCIENCE A-VIII**. Senior year, second semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisite: Military Science VII.

The course is divided into—

(a) *Practical*. Same as course 109 (a).

(b) *Theoretical*. Tactical problems; map maneuvers; rifle in war; lectures on military history and policy; orders and messages; tactical walks; military history.

BASIC COURSES, VETERINARY

(For students of the Division of Veterinary Medicine only.)

121. **MILITARY SCIENCE B-I**. Freshman year, first semester. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: None.

The work of this course is divided as follows:

(a) *Practical*. The same as course 101 (a).

(b) *Theoretical*. Duties of the enlisted personnel of the veterinary corps. Equipment of the veterinary corps soldier. Lectures upon the Articles of War and Army Regulations as they affect the soldier.

122. **MILITARY SCIENCE B-II**. Freshman year, second semester. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: Military Science B-I.

The work of this course is divided as follows:

(a) *Practical*. Same as course 102 (a).

(b) *Theoretical*. Principles of military animal sanitation, in permanent stations and in the field. Military animal equipment: bridles and bits, saddles, harness, and pack saddles.

123. MILITARY SCIENCE B-III. Sophomore year, first semester. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: Military Science B-II.

The work of this course is divided as follows:

(a) *Practical*. Same as course 102 (a); duties of privates and non-commissioned officers of the veterinary corps, demonstrated.

(b) *Theoretical*. Duties of privates and noncommissioned officers of the veterinary corps as members of detachments attached to various line organizations; study of equipment and transportation allotted to detachments; veterinary divisional organizations, duties and equipment; military animal sanitation (continued).

124. MILITARY SCIENCE B-IV. Sophomore year, second semester. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: Military Science B-III.

The work of this course is divided as follows:

(a) *Practical*. Same as course 102 (a) and course 123 (a).

(b) *Theoretical*. Veterinary regulations and manual of the medical department as it pertains to the veterinary corps; reports and returns used by the veterinary corps; types and specifications of military animals; army regulations (continued); field-service regulations; courts-martial manual (abstracted); company paper work.

ADVANCED COURSES, VETERINARY

(For students of the Division of Veterinary Medicine only.)

129. MILITARY SCIENCE B-V. Junior year, first semester. Lectures and recitations, three hours a week. Three semester credits. Prerequisite: Military Science B-IV.

This course is divided into—

(a) *Practical*. Duties of junior officers demonstrated.

(b) *Theoretical*. Records, reports, and returns required of a company organization; veterinary regulations and routine reports; veterinary hospitals—their function, organization, and equipment in peace and in war; organization of the veterinary corps in general.

130. MILITARY SCIENCE B-VI. Junior year, second semester. Lectures and recitations, three hours a week. Three semester credits. Prerequisite: Military Science B-V.

The course is divided into—

(a) *Practical*. Same as course 129 (a).

(b) *Theoretical*. Rudiments of map making and map reading; tropical medicine; military veterinary surgery; military veterinary medicine.

131. MILITARY SCIENCE B-VII. Senior year, first semester. Lectures and recitations, three hours a week. Three semester credits. Prerequisite: Military Science B-VI.

The course is divided into—

(a) *Practical*. Same as course 129 (a).

(b) *Theoretical*. Horseshoeing, especially that pertaining to army animals; military medicine and surgery; tropical medicine; animal sanitation; army regulations, abstracted and presented to the student on data governing his conduct as an officer.

132. **MILITARY SCIENCE B-VIII.** Senior year, second semester. Lectures and recitations, three hours a week. Three semester credits. Prerequisite: Military Science B-VII.

The course is divided into—

(a) *Practical.* Same as course 129 (a).

(b) *Theoretical.* Field-service regulations; rules of land warfare, abstracted in relation to the veterinary corps; lectures on the evacuation of animals in a campaign; hospitalization of animals; manual of courts-martial; summary of army veterinary organization.

BASIC COURSES, COAST ARTILLERY

(For students of the Division of Engineering, only.)

141. **MILITARY SCIENCE C-I.** Freshman year, first semester. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: None.

The work of this course is the same as for course 101.

142. **MILITARY SCIENCE C-II.** Freshman year, second semester. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: Military Science C-I.

The work of this course is the same as for course 102.

143. **MILITARY SCIENCE C-III.** Sophomore year, first semester. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: Military Science C-II.

The work of this course is divided as follows:

(a) *Practical.* Same as course 102 (a); artillery material; motor transportation.

(b) *Theoretical.* Infantry drill regulations; artillery material; motor transportation.

144. **MILITARY SCIENCE C-IV.** Sophomore year, second semester. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: Military Science C-III.

The work of this course is divided as follows:

(a) *Practical.* Section (a) of course 143, continued.

(b) *Theoretical.* Section (b) of course 143, continued.

NOTE.—The Basic Camp, which is held annually for about six weeks in the summer, is held for this school at Fort Winfield Scott, San Francisco, Cal.

ADVANCED COURSES, COAST ARTILLERY

(For students of the Division of Engineering, only.)

149. **MILITARY SCIENCE C-V.** Junior year, first semester. Lectures, recitations, and military drill, five hours a week. Three semester credits. Prerequisite: Military Science C-IV.

The course is divided into—

(a) *Practical.* Duties as cadet officers and noncommissioned officers in connection with courses 141, 142, 143, and 144; field engineering; artillery material; orientation; motor transportation.

(b) *Theoretical.* Gunnery; military law; and orientation.

150. **MILITARY SCIENCE C-VI.** Junior year, second semester. Lectures, recitations, and military drill, five hours a week. Three semester credits. Prerequisite: Military Science C-V.

This course is divided into—

(a) *Practical.* Section (a) of course 149, continued.

(b) *Theoretical.* Section (b) of course 149; administration; military hygiene; military policy.

151. **MILITARY SCIENCE C-VII.** Senior year, first semester. Lectures, recitations, and military drill, five hours a week. Three semester credits. Prerequisite: Military Science C-VI.

This course is divided into—

(a) *Practical.* Duties as cadet officers and noncommissioned officers; artillery material; orientation; field engineering.

(b) *Theoretical.* Administration; gunnery; employment of artillery.

152. **MILITARY SCIENCE C-VIII.** Senior year, second semester. Lectures, recitations, and military drill, five hours a week. Three semester credits. Prerequisite: Military Science C-VII.

This course is divided into—

(a) *Practical.* Section (a) of course 151; gunnery.

(b) *Theoretical.* Military law; gunnery, the employment of artillery; military policy.

NOTE.—Advanced course students are required to attend one camp. This comes normally at the end of the junior year and is held at the same place as mentioned above for the Basic Camp.

Modern Languages

Professor CORTELYOU
Assistant Professor LIMPER
Instructor HESSE

The study of modern foreign languages serves a number of purposes. It gives the student general training and culture; it throws helpful side lights upon English, his mother tongue; and it gives him important aid in scientific research. It is desired that the instruction in modern languages here given be as practical as possible, without, however, failing to encourage an appreciation of modern foreign literature. The plan of instruction in general is a combination of the grammatical and conversational methods, each of which has its own special advantages.

A realization of the growing importance of our relations to Spanish-speaking peoples has led to the introduction of Spanish courses, which may be taken as electives.

A number of literary and scientific periodicals published in French, Spanish, and German are received by the College Library, and afford the student excellent opportunity to amplify his reading knowledge of these languages.

Students who have had French, Spanish, or German in high school are required, as a rule, to take more advanced courses as their elective or required work in that language.

COURSES IN GERMAN

FOR UNDERGRADUATES

101. **GERMAN I.** Junior year and elective, first semester. Class work, three hours. Three semester credits. No prerequisite. Professor Cortel-you.

After two periods given to the acquisition of the sounds of the German letters, the student at once begins reading. Vocabularies are learned from the outset, while grammar is acquired gradually with the reading. Oral and written work and simple conversational exercises begin with the first reading lesson. In the work of this course there are included the first reading lesson. In the work of this course there are included the

study of articles, declensions of nouns and pronouns, the indicative mode of weak verbs, sentence order, and the comparison of adjectives. Frequent reviews enable the student to digest the facts presented, while the abundant conversation and written work subserves the same end. Text: Vos's *Essentials of German* (first eighteen lessons).

102. GERMAN II. Junior year and elective, second semester. Class work, three hours. Three semester credits. Prerequisites: German I, or its equivalent. Professor Cortelyou.

Students are repeatedly drilled on the grammatical constructions already emphasized in German I, of which this course is a continuation. The remaining important grammar points are studied. The general plan of the work is the same as in course 101. Essential facts of grammar are insisted upon, but German is taught as a living language. Written translations from English into German are frequent. Text: Vos's *Essentials of German* (completed).

111. GERMAN READINGS. Junior year and elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: German II, or its equivalent. Professor Cortelyou.

This course embraces readings of easy, idiomatic selections from modern authors. Grammatical drill is continued. German conversations based on the texts read are frequent. Text: *Aehrenlese*, by Bierwirth and Herrick.

FOR GRADUATES AND UNDERGRADUATES.

201. GERMAN SHORT STORIES. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: Course 111. Not given in the year 1920-'21. Professor Cortelyou.

The material read in this course comprises a number of short stories of considerable interest, by such modern authors as Auerbach, Niese, Goldhammer, La Roche, Leander, Scheffel, and Polenz. Text: Baker's *German Stories*.

206. GERMAN COMEDIES. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: Course 111. Given in the year 1920-'21 and alternate years thereafter. Professor Cortelyou.

The course comprises the reading of recent one-act comedies of literary merit, and of a realistic, lively, and cleanly humorous nature, including the following: Julius Rosen's *Ein Knopf*, Gustav von Moser's *Ein amerikanisches Duell*, Hugo Mueller's *Im Wartesalon erster Klasse*, and Emil Pohl's *Die Schulreiterin*. Exercises in conversation and sight reading are occasionally introduced. Text: Manley and Allen's *Four German Comedies*.

216. GERMAN HISTORICAL PROSE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Not given in the year 1920-'21. Professor Cortelyou.

In this course an insight is obtained of the Prussian government, administration of justice, military system, economic development, and strivings toward national unity as they existed at the time of Frederick the Great. Text: Rogge's *Der grosse Preussenkoenig*, edited by Adams.

221. GERMAN PROSE I. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Not given in the year 1920-'21. Professor Cortelyou.

This is a practical course designed to give the student an intimate knowledge of everyday German as used among the Germans in their various activities. The following are studied in this course: visits; the various stores; restaurants, meals, and expressions used at table; boarding houses and hotels; the family, weddings, marriages, etc.; dress; the school system; religion and church life; divisions of society; occupations; money, measures, and weights; festivities; traveling; the postal system, the telegraph, the telephone; the city in general; Berlin and cities of the

provinces; the country; the German empire; the military system; conversational phrases; the best German; everyday German. There are occasional sight translations, and some conversational work is done. Text: Kron's *German Daily Life*.

226. GERMAN CLASSICS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Course 216, 221, or 231. Not given in the year 1920-'21. Professor Cortelyou.

This is a course introductory to a study of the German classics. Two or three of the simpler works of classic authors, such as Lessing's *Minna von Barnhelm* and Goethe's *Hermann und Dorothea*, are translated in the work of this term. Textbooks: Lessing's *Minna von Barnhelm*, edited by von Minckwitz and Wilder, and Goethe's *Hermann und Dorothea*, edited by Allen.

231. GERMAN PROSE II. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Not given in the year 1920-'21. Professor Cortelyou.

This course is designed to give the student facility in the rapid translation of fairly easy prose. A number of modern short stories are read. Besides the more formal work, there are sight translations of easy selections. Text: Allen and Batt's *Easy German Stories*, Vols. I and II.

237. SCIENTIFIC GERMAN I. Senior year and elective, both semesters. Class work, four hours. Four semester credits. Prerequisite: Course 102. Professor Cortelyou.

This course is designed as an introduction to the vast field of scientific publications appearing in German. It consists chiefly in translating miscellaneous scientific articles, especially those dealing with chemistry and physics. Text: Dippold's *Scientific German Reader*.

241. SCIENTIFIC GERMAN II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 236. Professor Cortelyou.

This is a continuation of the preceding course. The material studied is of a more general nature than in course 236. Text: Greenfield's *Technical and Scientific German*.

COURSES IN FRENCH

FOR UNDERGRADUATES

151. FRENCH I. Freshman and sophomore years and elective, both semesters and summer school. Class work, three hours. Three semester credits. Assistant Professor Limper and Miss Hesse.

The phonetic symbols being a great help in the acquisition of accurate pronunciation, the first two days are devoted to learning these symbols and a number of useful expressions in French. The recitations are conducted largely in French and considerable time is devoted to conversation. Nevertheless, conversation is considered merely a means to the acquisition of a reading knowledge of French. The fundamentals of grammar are covered in this course and reading matter in the grammar is supplemented by a reader. Texts: Olmsted's *Elementary French Grammar* (first twenty-two lessons) and Allen and Schoell's *French Life* (thirty pages).

152. FRENCH II. Freshman and sophomore years and elective, both semesters and summer school. Class work, three hours. Three semester credits. Prerequisite: French I, or one year of high-school French. Assistant Professor Limper and Miss Hesse.

This course is a continuation of French I. The grammar is completed, special attention being given to irregular verbs. Reading and conversation are continued throughout the course. Students who have

had one year of French in high school begin with this course. Texts: Olmsted's *Elementary French Grammar* (Lesson XXII to the end), and Allen and Schoell's *French Life*.

161. FRENCH READINGS. Elective, first semester and summer school. Class work, three hours. Three semester credits. Not to be taken by students who have had course 154. Prerequisite: French II. Assistant Professor Limper and Miss Hesse.

This is essentially a reading course, the purpose being to enlarge the student's vocabulary. Grammar is reviewed and considerable time is devoted to conversation. Fontaine's *En France* and one other short French text are read.

FOR GRADUATES AND UNDERGRADUATES

251. FRENCH SHORT STORIES. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 154 or 161. Assistant Professor Limper and Miss Hesse.

The purpose of this course is to introduce the student to modern French literature. The modern short story, since it covers so large a range of subjects, also offers excellent material for the enlargement of the vocabulary. Stories by such writers as Daudet, Maupassant, and Zola are read. Text: Buffum's *French Short Stories*.

270. TEACHERS' COURSE IN FRENCH. Elective, second semester and summer school. Class work, three hours. Three semester credits. Prerequisite: Consult the instructor. Assistant Professor Limper.

The subject matter of this course falls under four heads, namely: pronunciation, grammar, reading material, and work outside of the regular curriculum. Under the first heading, the anatomical basis for the production of the sounds peculiar to the French language are treated. Under the second heading not only are methods of presenting grammar dealt with, but a thorough and systematic review of the subject is included. The third division consists of a careful examination of the various reading texts used in the state. Under the fourth heading, methods of conducting a *Cercle français* and material to be used in it are treated.

COURSES IN SPANISH

FOR UNDERGRADUATES

176. SPANISH I. Elective, both semesters and summer school. Class work, three hours. Three semester credits. Assistant Professor Limper and Miss Hesse.

In this course nouns, adjectives, pronouns, demonstratives, and numerals are treated and the indicative mode of verbs is studied. The course is largely conducted in Spanish, the student gradually acquiring a fair-sized and practical vocabulary. Text: Hills and Ford's *First Spanish Course* (first thirty-one lessons).

177. SPANISH II. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: Spanish I, or one year of high-school Spanish. Miss Hesse.

In addition to study of grammar, which is here completed, considerable reading is done. Stress is laid upon training the ear to understand spoken Spanish. Texts: Hills and Ford's *First Spanish Course* (completed), and Bergé-Soler and Hatheway's *Elementary Spanish-American Reader*.

180. SPANISH READINGS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Spanish II. Miss Hesse. A thorough study is made of one or two of the best works in Spanish

literature from the more modern writers. One hour a week is devoted entirely to conversation and composition, the subjects being taken from current topics of the day. Text: Mármol's *Amalia*, edited by Corley.

183. COMMERCIAL SPANISH. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Spanish II. Miss Hesse.

This course is intended to equip the student with a commercial vocabulary and with the elements indispensable to success, especially necessary if he should pursue his business in Latin-American countries. Text: McHale's *Commercial Spanish*.

Music

Professor WESTBROOK*
 Assistant Professor SMITH
 Instructor KIMMEL
 Instructor CURREY*
 Instructor LEFFLER
 Instructor LOVEJOY*
 Instructor WHEELER
 Instructor HANNEN

Instructor BAKER
 Instructor RINGO
 Instructor KELLER
 Instructor WARREN
 Instructor WILLIAMS
 Instructor COLBURN
 Instructor HASSINGER
 Miss ROBINSON

The aim of the Department of Music is, to be of vital value in the life of every student. The department strives to create and foster a love and appreciation for the best in music and to give to students that broader culture and more complete education which is gained through academic and professional and vocational training combined with musical and artistic study. Believing that this can be accomplished to a much greater degree by having artistic performers among us, courses are offered which will prepare those who so desire to be efficient in some chosen musical line. Students enrolled in the department participate in the musical contributions to the public programs of the College, and such participation is a part of their training and duty.

METHODS OF INSTRUCTION

Instruction in voice and instrumental music is given in private lessons. No two students have the same mental, physical or artistic capacity, and their individual capabilities can be neither properly nor fully developed without painstaking personal attention. The best results are dependent on a close adaptation to the individual needs of the pupils, and this, of course, cannot be gained in classes, as is the case in the individual lessons. The effectiveness of the methods used is demonstrated by the interest and progress of the pupils.

All theoretical work is taught in classes. These and some other classes in the Department of Music are free to any student in the institution.

CREDITS

Students taking work in the Department of Music are allowed credits on their work in the Divisions of General Science, Home Economics, and Agriculture, while substitutions in music, with the approval of the dean, may be made in the Division of Engineering, as follows: For Voice or

* Resigned June 2, 1921.

some instrument, two hours each semester; for Musical History, two hours each semester; for Harmony, two hours each semester; for Counterpoint, Musical Form and Musical Analysis, two hours each semester; for Chorus, Orchestra or Band, one hour each semester; for Public School Music Methods, two hours each semester. Any student having a full assignment may, upon recommendation of the director of music together with the approval of the student's dean, take music without credit.

Students coming from other schools to enter our courses in music may be sufficiently advanced as players or singers to enter the second or third year of the regular music curricula but prohibited therefrom owing to their lack of knowledge of theory. If such students enter the first year of the theoretical course, their progress as players and singers is not retarded, but it would be much to their advantage to make special theoretical preparation in the hope of qualifying for more advanced standing.

CURRICULUM LEADING TO THE DEGREE OF BACHELOR OF MUSIC

In addition to the requirements outlined below, a high-school education or its equivalent is necessary for a degree.

For entrance to the vocal course leading to a degree, the candidate for admission shall furnish proof that he has completed grades one and two of the high-school vocal course and grades one and two of the high-school piano course, or their equivalent, as outlined by the Kansas State Music Teachers' Association.

For entrance to the piano or organ course leading to a degree, the candidate for admission shall furnish proof that he has completed grades one to six, inclusive, of the high-school piano course, or its equivalent, as outlined by the Kansas State Music Teachers' Association.

For entrance to the violin course leading to a degree, the candidate for admission shall furnish proof that he has completed grades one to six, inclusive, of the high-school violin course, or its equivalent, as outlined by the Kansas State Music Teachers' Association.

The professor of music, together with the instructor with whom the candidate chooses to study voice or his chosen instrument, shall decide whether or not the candidate for admission can musically qualify for admission as a freshman in this course. Those who cannot qualify musically may enter upon their theoretical and collegiate subjects, but will be considered preparatory students in their chosen instrument until, in the judgment of the instructor and the professor of music, the student may be classified in this course. As to the length of time it takes to complete this course satisfactorily, much depends upon the natural ability of the pupil, the intensity of his application, and the time he spends in developing the art of his particular instrument.

Outline of Curriculum in Music Leading to the Degree of Bachelor of Music

FIRST YEAR

FIRST SEMESTER:

- Voice or some instrument. Two lessons a week. Two semester credits.
- Harmony I. Two one-hour recitations a week. Two semester credits.
- Ear Training and Sight Singing I. Two one-hour recitations a week. Two semester credits.
- Musical Appreciation I. One one-hour recitation a week. One semester credit.
- Ensemble. Choral Society, orchestra, band, glee club, or piano. One semester credit.
- College Rhetoric I. Three one-hour recitations a week. Three semester credits.
- Physical Education. Two hours a week for men; three hours a week for women.

SECOND SEMESTER:

- Voice or some instrument. Two lessons a week. Two semester credits.
- Harmony II. Two one-hour recitations a week. Two semester credits.
- Ear Training and Sight Singing II. Two one-hour recitations a week. Two semester credits.
- Musical Appreciation II. One one-hour recitation a week. One semester credit.
- Ensemble. Choral Society, orchestra, band, glee club, or piano. One semester credit.
- College Rhetoric II. Three one-hour recitations a week. Three semester credits.
- Harmonics. Two one-hour recitations a week. Two semester credits.
- Physical Education. Two hours a week for men; three hours a week for women.

SECOND YEAR

FIRST SEMESTER:

- Voice or some instrument. Two lessons a week. Two semester credits.
- Harmony III. Two one-hour recitations a week. Two semester credits.
- Musical History I. Two one-hour recitations a week. Two semester credits.
- Ensemble. Choral Society, orchestra, band, glee club, or piano. One semester credit.
- Recital.
- German I. Three one-hour recitations a week. Three semester credits.
- Physical Education. Two hours a week for men; three hours a week for women.

SECOND SEMESTER:

- Voice or some instrument. Two lessons a week. Two semester credits.
- Harmony IV. Two one-hour recitations a week. Two semester credits.
- Musical History II. Two one-hour recitations a week. Two semester credits.
- Ensemble. Choral Society, orchestra, band, glee club, or piano. One semester credit.
- Recital.
- German II. Three one-hour recitations a week. Three semester credits.
- Physical Education. Two hours a week for men; three hours a week for women.

THIRD YEAR

FIRST SEMESTER:

- Voice or some instrument. Two lessons a week. Two semester credits.
- Counterpoint. Two one-hour recitations a week. Two semester credits.
- Ensemble. Choral Society, orchestra, band, glee club, or accompanying. One semester credit.
- Recital.
- Normal Methods.
- Psychology. Three one-hour recitations a week. Three semester credits.

SECOND SEMESTER:

- Voice or some instrument. Two lessons a week. Two semester credits.
- Musical Form and Musical Analysis. Two one-hour recitations a week. Two semester credits.
- Ensemble. Choral Society, orchestra, band, glee club, or accompanying. One semester credit.
- Recital.
- Practice Teaching.
- Educational Psychology. Three one-hour recitations a week. Three semester credits.

FOURTH YEAR

FIRST SEMESTER:

- Voice or some instrument. Two private lessons a week. Two semester credits.
- Musical Theory I. (Composition, orchestration, and conducting.) Two one-hour recitations a week. Two semester credits.
- Ensemble. Choral Society, orchestra, band, glee club, or piano. One semester credit.
- Recital.
- French I. Three one-hour recitations a week. Three semester credits.
- English Literature I. Four one-hour recitations a week. Four semester credits.

SECOND SEMESTER:

- Voice or some instrument. Two private lessons a week. Two semester credits.
- Musical Theory II. (Composition, orchestration, and conducting.) Two one-hour recitations a week. Two semester credits.
- Ensemble. Choral Society, orchestra, band, glee club, or piano. One semester credit.
- French II. Three one-hour recitations a week. Three semester credits.
- Recital.

Vocal students must offer, in addition to the course as outlined above, eight credits in piano.

Students of piano, violin, organ, etc., must offer four credits in either voice or some instrument other than their major subject.

Upon the approval of the Dean of the Division of General Science and the professor of music, substitutes in collegiate subjects such as German, English, etc, as outlined above, may be made, these substitutes to be made in literary lines.

The degree of Bachelor of Music is conferred upon students who complete the curriculum in music as outlined in the foregoing statement.

In addition to the course as outlined, students should elect a sufficient number of hours in the Department of Education, so that in addition to receiving the degree of Bachelor of Music they may also receive from the State Board of Education a teachers' certificate which will allow them to teach in the high schools of the state.

CURRICULUM IN APPLIED MUSIC

By applied music is meant the practical and scientific study of voice, piano, violin, violoncello, organ or some band instrument in private, individual lessons, together with the study of theoretical subjects in classes. This curriculum is designed to fit students not only to be soloists but also to be efficient teachers of music.

The curriculum in applied music is the same as the first three years of the preceding curriculum (the curriculum leading to a degree in music) as outlined above.

A certificate is awarded to students who complete the curriculum in applied music. A high school education or its equivalent is a prerequisite to the awarding of the certificate. Those not qualified to take up the curriculum in applied music are considered as preparatory students until, in the judgment of the professor of music, their work justifies a change in classification. Each candidate for a certificate must give a public recital some time during the second semester of his third year.

CURRICULUM IN PUBLIC-SCHOOL MUSIC

For those wishing to prepare themselves to teach music in the public schools a curriculum in public-school music, as outlined below, has been prepared. The completion of a four-year high-school course or its equivalent is required before entering on the work here outlined. To those satisfactorily completing this curriculum a state teachers' certificate in music is granted.

Outline of Curriculum in Public-school Music**FIRST YEAR****FIRST SEMESTER:**

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods I. Two semester credits.
 Harmony I. Two semester credits.
 Ear Training and Sight Singing I. Two semester credits.
 Psychology. Three semester credits.
 Chorus. One semester credit.
 Musical Appreciation I. One semester credit.
 College Rhetoric I. Three semester credits.
 Physical Education.

SECOND SEMESTER:

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods II. Two semester credits.
 Harmony II. Two semester credits.
 Ear Training and Sight Singing II. Two semester credits.
 Chorus. One semester credit.
 Musical Appreciation II. One semester credit.
 Methods in Teaching. Three semester credits.
 College Rhetoric II. Three semester credits.
 Physical Education.

SECOND YEAR**FIRST SEMESTER:**

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods III. Two semester credits.
 Harmony III. Two semester credits.
 Chorus. One semester credit.
 Musical History I. Two semester credits.
 Educational Administration. Three semester credits.
 French I. Three semester credits.
 Physical Education.

SECOND SEMESTER:

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods IV. Two semester credits.
 Harmony IV. Two semester credits.
 Chorus. One semester credit.
 Musical History II. Two semester credits.
 French II. Three semester credits.
 American Literature. Three semester credits.
 Physical Education.

THEORETICAL COURSES IN MUSIC

The aim of theoretical courses is primarily to give the student an intelligent conception of music as a science, and give him such working knowledge of the material of music as will fit him for intelligent appreciation, criticism and interpretation; and secondarily, to form a broad foundation for later study in composition.

101, 102. **HARMONY I AND II.** Elective, beginning first semester and continuing throughout the year. Class work, two hours. Two semester credits for each course. Miss Baker.

This course consists of a study of the following: Scales and intervals; primary and secondary triads and their inversions; harmonizing of given basses and melodies; chords of the dominant seventh; secondary seventh chords; modulation; original work begun; ear training; key-board harmony.

103, 104. **HARMONY III AND IV.** Elective, beginning first semester and continuing throughout the year. Class work, two hours. Two semester credits for each course. Prerequisite: Harmony II. Miss Baker.

This course includes a study of the following: Modulations, continued; altered chords; suspensions; foreign tones; pedal points; figuration; accompaniments; original work; ear training; elementary harmonic analysis; elementary analysis of form.

105, 106. **EAR-TRAINING AND SIGHT SINGING I AND II.** Elective for all students; required with Harmony I and II for music students. Class work, two hours. No College credit, but required in the music curricula. Miss Baker.

This course is a study in reading and hearing intervals and chords.

107. **COUNTERPOINT.** Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Harmony IV. Miss Baker.

The course in counterpoint consists of the study of simple counterpoint in two parts; first, second, third, fourth and fifth species, and florid counterpoint.

109. **MUSICAL FORM AND MUSICAL ANALYSIS.** Elective, second semester. Class work, two hours. Two semester credits. Prerequisites: Harmony IV and Counterpoint. Miss Baker.

Chord reading and the accounting theoretically for every note in a piece of music, combined with analytical study of hymn tunes, preludes, inventions, and dance forms of Bach, small instrumental forms, song forms, sonata forms, cantata and oratorio forms are the substance of this course.

110, 111. **HISTORY OF MUSIC I AND II.** Elective, beginning first semester and continuing throughout the year. Students may enter at the beginning of either semester, however. Class work, two hours. Two semester credits for each course. Miss Baker.

A modern text forming the basis of this work is supplemented by lectures and library research. Time is given to the early and primitive development of the art, but special stress is laid upon the classical, Roman and modern periods, together with the present-day conditions and tendencies. In addition to theses upon the general historical and critical subjects, the class is also given practice in journalistic criticism of concert and recital performances.

115, 116. **MUSICAL APPRECIATION I AND II.** Elective. Students may enroll at the beginning of either semester. Class work, one hour. One semester credit for each course. Miss Baker.

Music is a language, and like language must be learned by hearing. As it is the sole design of this course to facilitate intelligent listening, the student's powers of imagination and observation are appealed to at once.

The work is presented in a nontechnical way, in the form of illustration from a talking machine. The subjects treated are melody, rhythm, form, cadence, classical and romantic ideals, present-day tendencies, songs, piano, violin, orchestra, band, chorus, opera, etc., and differences in concert and recital programs.

Several different hours are devoted to this work, so that many students may be accommodated at periods which will suit their convenience.

120, 121. SCHOOL MUSIC METHODS I AND II. First semester and continuing throughout the year. Lectures and research, three hours. Two semester credits for each course. Miss Baker.

These courses deal with the place of music and the teacher in the school and in the community.

122, 123. SCHOOL MUSIC METHODS III AND IV. First and second semesters, respectively. Lectures, research, and practice teaching, three hours. Two semester credits for each course. Miss Baker.

These courses are a continuation of School Music Methods I and II.

PRACTICAL COURSES IN MUSIC

130. VOICE. Two private lessons a week. Two semester credits. Elective in College curricula. Professor Westbrook, Miss Kimmell, Mr. Lovejoy, Miss Curry, and Mr. Williams.

The course of instruction is based primarily upon the Italian school for training voices. Correct tone placement, so that the pupil produces tones throughout all registers with ease, and with firm, even quality, is the foundation of good singing. During the first year especial attention is given to a systematic course in breathing, tone placement and analysis of vowels and consonants relative to vocal needs. At all times attention is given to perfect enunciation, and German, French, and Italian diction is taught in connection with actual song coaching. The song literature of America, England, Germany, France and Italy is studied, and a satisfactory performance of songs, oratorio or operatic arias from each one of these schools is necessary. Students specializing in voice in this course are expected to be or become able to play simple accompaniments.

135. VIOLIN. Two private lessons a week. Two semester credits. Elective in College curricula. Miss Hannen and Miss Hassinger.

In this department the aim is to teach the fundamentals of violin playing in such a manner as to lay the foundation of intelligent musicianship. In this work, as in the other lines of musical endeavor, mastery of the instrument is a task which imposes different difficulties upon every student. Natural ability, physical characteristics and the general make-up of the individual so influence progress that no definite method of instruction can be outlined which can be profitably pursued by all players. However, particular attention is paid to the correct position of the student while playing, and also to the manner of holding the violin and bow. A graceful and natural method of playing is insisted upon, and great care is exercised to develop an accurate feeling for good intonation. Elementary scale work is begun at an early period and is gradually extended. Studies and exercises from the best writers are selected and, as the student develops, the entire field of violin literature is open for study.

Violoncello, viola and contrabass receive the same attention in this department as does the violin.

140. PIANO. Two private lessons a week. Two semester credits. Elective in College curricula. Assistant Professor Smith, Misses Leffler, Keller, Warren, Colburn, and Mr. Ringo.

The methods of this department are direct and simple and are based on scientific principles. The purpose of the department is to make music lovers of its students, and for those who plan to make music a profession to give a solid technical foundation, to cultivate a thinking musicianship, to acquaint students with a generous amount of the best music literature, to develop capable teachers and good amateur performers, and thus to furnish the foundation upon which the superstructure of the artist may be built.

The piano course as outlined for each year is a conservative estimate of what a student of average talent is expected to accomplish and is based on three hours' practice daily the first two years and four hours daily the last two years.

In the piano ensemble classes, whose purpose is to develop sight reading and concerted playing, the student has an opportunity to become acquainted with some of the best orchestral works arranged for this purpose.

Normal Piano Methods. Courses in Normal Piano Methods are offered, and these consist of one semester hour of class work and frequent observation of lessons given in the Preparatory Department. In the second semester practice teaching is required. This work should be taken by junior students, but sophomores judged capable may elect it.

Preparatory Department. This department is divided into two sections. The first consists of College students not able to meet the College entrance requirements in piano, and high-school students. The second section consists of children, one hour of class work each week supplementing private lessons.

Special training is given in rhythm, sight reading, scale building, melody writing, ear training, and appreciation. This work aims to develop in the student a natural means of expression through music and to furnish the right foundation for a musical education.

145. WIND INSTRUMENTS. Two private lessons a week. Two semester credits. Elective in College curricula. Mr. Wheeler.

In this department opportunity is offered for the study of any wind instrument. Both the Albert and Boehm systems of clarinet playing are taught, while the semi-no-pressure system of cornet playing is used. In this as in other departments the work is taught beginning with elementary scale and technical study and extending over the more difficult literature written for wind instruments. Instruction in instrumentation, conducting and formation of bands is also given.

147. STAGE DEPARTMENT. The course in stage department is designed to provide definite training in regard to appearance, including the principles of poise, correct standing, walking, sitting, bowing, etc. It also provides instruction in individual and ensemble gesture and character delineation for lyric and operatic action in staging concerts and operettas.

MUSICAL ORGANIZATIONS

Every voice and each instrument has a distinct function in the science of tonal expression, and only in the combination of voices and instruments are the finest effects in the coloring of melody, harmony and rhythm produced. This combination is made possible in the Department of Music by the number of students enrolled in the College and by the variety of ensemble organizations.

150. THE CHORAL SOCIETY. Throughout the year. Weekly rehearsals, all special rehearsals and public performances. One credit each semester.

This organization, which is conducted by Professor Westbrook, numbers about two hundred, and is one of the best student singing organizations in the West. The rehearsals are held Monday evening, weekly, and part songs, madrigals, glees, cantatas, and the great oratorios are studied,

and presented publicly with the assistance of the orchestra and visiting artist soloists.

151. **THE ORCHESTRA.** Regular rehearsals, all special rehearsals and public performances. One credit each semester.

The orchestra is conducted by Mr. Wheeler, teacher of band instruments. It is a definite organization wherein discipline prevails and permanent membership with regular attendance is insisted upon. This body maintains a correct and well-balanced instrumentation, containing all the instruments of the modern symphony orchestra. The work is highly educational, and offers in the preparation for concerts and performances with the choral society the actual experience and routine necessary for efficient orchestra playing. Membership is open to all in the College who are capable of playing acceptably.

152. **THE COLLEGE BAND.** Regular rehearsals, special rehearsals and public performances. One credit each semester.

Practice in the band may be accredited through the Department of Military Science in lieu of drill and theoretical instruction. The band furnishes music for all ceremonies of a military character and for various other College occasions.

THE APOLLO CLUB. The Apollo Club consists of about thirty of the best men's voices in the institution. The try-out for this singing body is held in the first semester of each year and the club is chosen from a large number seeking admission. A "waiting list" is maintained, and a place made vacant in the club by the dropping out of a member is immediately filled by one of this list.

The singing of the Apollo Club is characterized by striking vigor, spontaneity, clear enunciation, shading and color, all of which are vital elements in artistic singing. This organization is available for a limited number of concert engagements and recitals throughout the state. Mr. Lovejoy.

THE ST. CECILIA CLUB. This is a singing organization of young women, and is without doubt one of the finest organizations of its kind in the West. The voices are selected with the utmost care as to range, blending qualities and special adaptability to the work, thus securing an almost perfect ensemble. The St. Cecilia and Apollo clubs are combined for special choir singing. Mr. Lovejoy.

RECITALS AND CONCERTS

Unusual advantages for hearing good music are afforded at this institution. In addition to numerous choral, orchestra, band and glee-club concerts given, in which the leading soloists of the country are heard assisting, a number of great artists are brought to our College in the Artist Series Course and during Spring Festival Week. There are also numerous recitals by the members of the conservatory faculty and by students.

FEES

For a semester of eighteen weeks:

| | |
|---|----------------------|
| Voice with the director, two lessons per week per semester..... | \$38.00 |
| Voice with the director, one lesson per week per semester..... | 20.00 |
| Voice with Mr. Lovejoy, two lessons per week per semester..... | 38.00 |
| Voice with Mr. Lovejoy, one lesson per week per semester..... | 20.00 |
| Voice, violin, piano, band and wood wind instruments, two lessons per week per semester, according to teacher chosen..... | \$32, \$28, or 25.00 |
| Voice, violin, piano, band and wood wind instruments, one lesson per week per semester, according to teacher chosen..... | \$18, \$15, or 13.50 |
| Organ, two lessons per week per semester..... | 38.00 |
| Organ, one lesson per week per semester..... | 20.00 |
| Piano Normal (limited to four in a class) per semester..... | 10.00 |
| Stage Department (limited class)..... | 10.00 |
| Piano rent, one hour daily per semester..... | 4.00 |
| Organ rent, one hour daily per semester..... | 10.00 |

Physical Education and Athletics

Professor AHEARN
Assistant Professor BACHMAN
Assistant Professor KNOTH
Assistant Professor BOND

Assistant TAUSCHE
Assistant EVANS
Assistant _____
Assistant _____

The purpose of the Department of Physical Education and Athletics is to assist the students of the College to live to the best advantage, and so to aid them in the formation of hygienic habits that during their College course they may make profitable physical preparation for life. It is an urgent necessity that each student have an intelligent appreciation of the means requisite for the preservation of his health, in order that he may be able to formulate intelligently his own policy of health control.

All young men and all young women of the College are entitled to the privileges of the gymnasium, which is one of the largest in the West and is well equipped with all sorts of apparatus for physical training, with lockers, plunge baths, shower baths, and other accommodations.

PHYSICAL EDUCATION FOR MEN

Physical education is required of all freshmen and sophomores unless excused for disability by the College physician. After the requirement is completed, advanced work may be elected for a total of four hours of credit.

PHYSICAL EXAMINATIONS

The work of the department is based largely upon a physical examination given each student when he enters upon the work of the department. A second examination is given at the close of his first year. All students, whether taking work in the department or not, are entitled to receive a physical examination and advice as to their physical condition.

The measurements taken and the tests given have each a definite purpose with reference to ascertaining the muscular condition of the individual. A diagnosis is also made of the vital organs to ascertain their functional conditions, and a complete inspection of the whole body is made to detect any weakness or deformity that may exist. Based upon the information thus obtained, advice is given and work is assigned to students in accordance with their physical needs, tastes, and capabilities. Delicate students and those suffering from functional disorders receive individual attention. Students organically sound are assigned work in a carefully graded and progressive system of gymnastics and athletics. All candidates for athletic teams should enroll in the department, submit to a thorough physical examination, and pass the grade tests before being allowed to compete for positions on the various teams. Students engaging in two or more sports during the school year must undergo a physical examination preliminary to participation in each sport. This is required in order that no student may engage in athletics to his own permanent physical injury. Each student may secure a copy of his physical measurements, and an anthropometric chart, showing in graphic form his development as compared with that of the average man.

Members of the teams, reporting regularly, are excused from regular class work, and are entitled to full credit in that portion of their work; but before the completion of the course at least two semesters' work must be done in the gymnasium. Credit, the equivalent of a one-hour subject, is given and counts toward the College degree. The individual's grade rests largely on the basis of attendance, punctuality, earnestness, and application, but practical tests are also given.

Regulation uniforms must be worn in the gymnasium. Students are advised not to procure uniforms until after their arrival at the College.

Various grades of gymnastic and athletic exercises are offered by the department. The great variety of exercises offered is intended to meet all individual needs, capacities and tastes. A physical examination and test determines the grade or class of exercises for which a student is fitted.

COURSES IN PHYSICAL EDUCATION

103. PHYSICAL EDUCATION M-I. Freshman year, first semester. Two hours a week. Assistant Professor Knoth.

Hygiene and social problems are discussed as an essential part of this course. This instruction gives an insight into the practical problems of daily healthy living from a personal point of view. Directions are given for avoiding the common ills of student life, and for maintaining the highest physical and mental condition while in College, as well as for gaining the highest development of vital power and health for future duties.

During the winter the practical work is conducted indoors, and consists of light and heavy gymnastics, which are selected with a view to obtaining progressive effect upon the bodily organism. During the fall a man may select Rugby football or soccer football. Beginning about December first the work consists of the following:

a. *Free Calisthenics*. Exercises are selected for their different effects upon the bodily organism, and are arranged in the order of increasing difficulty. They involve hygienic or body-building work, educative movement, and corrective or remedial exercises. Both the Swedish and the German systems are used.

b. *Light Apparatus*. Training is given in the use of Indian clubs, dumb-bells, wands, bar bells, etc.

c. *Heavy Apparatus*. Graded exercises are given on parallel bars, vaulting bars, bounce board and mat, side and long horse, high and low horizontal bars, traveling and flying rings, etc.

d. *Indoor Athletics*. Instruction is given in all indoor track events preparatory to indoor track meets.

e. *Games*. There are included basket ball, indoor baseball, volley ball; also other games of more recreative nature.

104. PHYSICAL EDUCATION M-II. Freshman year, second semester. Two hours a week. Assistant Professor Knoth.

This course is a continuation of Physical Training M-I. Baseball, track and field athletics are given in the spring as soon as weather conditions permit outdoor work. A part of the regular instruction for the spring semester is in swimming. A passing grade must be made in this phase of the work also.

105. PHYSICAL EDUCATION M-III. Sophomore year, first semester. Two hours a week. Assistant Professor Knoth.

This course is a continuation of Physical Education M-II. It is required of all young men of the sophomore class.

106. PHYSICAL EDUCATION M-IV. Sophomore year, second semester. Two hours a week. Assistant Professor Knoth.

This course is a continuation of Physical Education M-III. It is required of all young men of the sophomore class.

110. ADVANCED APPARATUS I. Elective, first semester. Three hours a week. One semester credit. Assistant Professor Knoth.

This course is open only to those men who show ability as gymnasts. From this class men are picked for the gymnastic team. Tumbling and work on the various pieces of apparatus are given.

111. ADVANCED APPARATUS II. Elective, second semester. Three hours a week. One semester credit. Assistant Professor Knoth.

This is a continuation of Advanced Apparatus I.

120. PHYSICAL TRAINING SPECIALTIES. Under this head come fencing, boxing, wrestling, offered as advanced work to those who have had not less than two semesters of work in the gymnasium. Hours are arranged with the instructor.

126. FOOTBALL. Elective, summer school. Lectures and recitations, four hours. Two semester credits. Professor Ahearn.

This course covers the following phases: Spirit of the game, discussion of the rules, tackling the dummy, charging sled, defense in general, line defense, secondary defense, kick-off, punting, place kicking, drop kicking, direct pass plays, systems of offense in general, quarter-back pass plays, interference, signals, training, and equipment.

130. BASKET BALL. Elective, summer school. Lectures and recitations, two hours. One semester credit. Professor Ahearn.

The work covers a discussion of the rules, technique of basket shooting, foul throwing, catching and passing, dribbling, reverse turn, different styles of play, offense, defense, team work, selection of players, training and equipment.

135. BASEBALL. Elective, summer school. Lectures and recitations, two hours. One semester credit. Professor Ahearn.

The course includes discussion of the rules, fielding, batting, bunting, base running, sliding, team work, pitching, catching, proper way to play each position, indoor and outdoor practice methods, coaching, signals, training and equipment.

140. TRACK AND FIELD SPORTS. Elective, summer school. Lectures and recitations, two hours. One semester credit. Professor Ahearn.

This course covers discussion of the rules, starting, sprinting, distance running, hurdling, jumping, vaulting, shot putting, discus throwing, javelin throwing, training, dieting, and equipment.

142. THEORY OF PHYSICAL EDUCATION AND PLAYGROUND MANAGEMENT. Elective, summer school. Lectures and recitations, two hours. One semester credit. Assistant Professor Knoth.

The theory of the systems of physical education is studied. The philosophy of play, and the organization and equipment of the playground are considered.

144. CALISTHENICS AND GAMES. Elective, summer school. Lectures and recitations, six hours. Three semester credits. Assistant Professor Knoth.

In this course the following topics are studied: Calisthenics with and without hand apparatus, including gymnastic marching tactics; personal proficiency in execution and exactness of form; progression and value of system in these exercises; use of wands, clubs, dumb-bells, etc.; practice teaching; plays and games to meet the requirements of children of all ages; simple teams, group and competitive teams.

146. ADMINISTRATION AND ORGANIZATION IN PHYSICAL EDUCATION. Elective, summer school. Lectures and recitations, two hours. One semester credit. Assistant Professor Knoth.

Problems in administration and organization of work in physical education are taken up. Intercollegiate, intramural, and mass athletics are studied. Sportsmanship and ethics are considered.

ATHLETICS

DEPARTMENTAL ATHLETICS. In the fall and in the spring the courses in the gymnasium are partly supplemented by instruction in outdoor athletics. Individuals are assigned to the kind of work best suited to them. Attendance is compulsory upon those participating. In the fall the following sports are offered: football; track and field events; cross-country running; and outdoor basket ball. In the spring are offered: baseball; track and field events; cross-country running; and outdoor basket ball.

Cross-country running is encouraged throughout the year. Natural exercise in the open air takes precedence of all other forms of exercise. Opportunity is offered for tennis, but it cannot be elected in place of required work.

Days unsuited for outdoor work are devoted to a discussion of playing rules, the principles of training for athletic contests, and lectures on team work.

INTRAMURAL ATHLETICS. All athletics within the institution, including the School of Agriculture teams, come directly under the supervision of the Department of Physical Education. It is the aim of the department to furnish an opportunity for all students to participate in some form of healthful athletic competition. To carry out the above aim, class football is maintained during the fall among the different classes of the College, also among the different classes of the School of Agriculture. Basket ball also is promoted during the fall and early part of the winter among the different fraternities, different classes, and different cadet companies, as well as among the students of the different departments of the College.

The work of the spring is largely given over to competition in baseball among the different classes, both in the College and School of Agriculture, the different departments of the institution and boarding-house teams. It is the aim of the department, too, to revive an interest in track athletics among the different classes of the institution. All these activities as promoted will be run, as nearly as possible, on a tournament plan, making it possible for a large majority of the students to participate in some form of activity. Suitable trophies will be presented and suitable emblems will be granted to participants on winning teams.

In addition to interclass competition there will be a small outside schedule for the School of Agriculture in the different forms of athletics promoted by the department.

By action of the Student Council, approved by the Faculty, the following rules govern class athletics contests:

1. Managers of class teams are required to play only men who hold assignments to the class with which they play.
2. The requirements for participation in class games are the same as for varsity teams.
3. The respective managers of class athletics are required to present a certified list of eligible players to each other at each game.
4. No man who has been a member of the varsity squad during a given season shall participate in a class game during that season.
5. No man shall participate in a class game who has won a K in that sport.

INTERCOLLEGIATE ATHLETICS. These contests are promoted and encouraged for the more vigorous students, because of their effect upon College life and their wide social and moral value to the participants. Intercollegiate teams should represent the final stage of selection in an educational process and development among a large number of students, thereby giving both a rational physical-education system and a healthful system of sport. Intercollegiate contests are scheduled for football, basket ball, track athletics, and tennis. The College is a member of the Missouri Valley Conference and competes with the best teams in the Middle West.

Intercollegiate athletics are placed under the supervision of the Athletic Board by an order of the Board of Administration. This Athletic Board consists of the President of the College, four other members of the Faculty appointed by the Board of Administration, and one member from each College class, elected by the respective classes.

Participation in intercollegiate athletic contests is fixed by the following Missouri Valley Conference rules:

1. No student is eligible who receives pay from his institution as a regular instructor.
2. No student is eligible who receives pay for his services as player or manager of his team.
3. No student who has received pay for his athletic skill or knowledge is eligible to participate in any intercollegiate contest (except for summer baseball prior to 1912).
4. No student shall participate in contests as a member of an athletic team except on his home baseball team. No student shall play under an assumed name.
5. No student shall participate in intercollegiate sport for more than three years.
6. No graduate student shall participate in any intercollegiate contest.
7. No student shall participate in intercollegiate contests who has not been in attendance one full year prior to the date of contests, who has not passed in his entrance requirements, who has not passed in at least 30 semester hours' work during the year previous to the contest, and who is not maintaining passing grades in 12 credit hours during the current semester.
8. No person who, having participated in any intercollegiate contest, fails to remain in College the remainder of that semester, unless excused by his Dean for sickness, or other sufficient reason, shall participate again until he shall have completed six months of work following his last participation.

PHYSICAL EDUCATION FOR WOMEN

All young women in the College are required to take two years of physical education unless excused by the dean of women.

After the two years' required physical education have been completed, women have the privilege of electing physical education for a total of four credit hours; such elective work must be approved by their dean. Athletic Association points are awarded for elective work.

PHYSICAL EXAMINATIONS

A physical examination of each young woman is made by the instructor in charge of women before permission to enter a class is given. This includes a system of body measurements, strength tests, and examination of the condition of the heart and lungs. Physical defects, abnormalities

and weaknesses are noted, and special exercises are provided for the student needing the individual corrective work.

A suit has been adopted which consists of an all-white middy blouse, black tie, and black, plaited bloomers. White tennis shoes with white rubber soles are used. For swimming, girls must have the regulation one-piece tank suit made from brown cotton covert, according to a pattern approved by the Department of Physical Education, or a one-piece gray knit suit. Girls should not buy their swimming suits before arriving in Manhattan. For further information address Women's Department of Physical Education, K. S. A. C., Manhattan, Kan.

COURSES IN PHYSICAL EDUCATION

151A. PHYSICAL EDUCATION W-I. Freshman year, first semester. Lectures and gymnasium, three hours. One semester credit. Dean Van Zile, Assistant Professor Bond, Miss Tausche, and Miss Evans.

Instruction in hygiene and social problems is an essential part of this course. In these lectures, in addition to the problems of hygiene as applied to individual health, the biological truths that lead to serious, respectful consideration of social and sex hygiene are presented. This part of the course is given by the dean of women.

The physical training part of this course is divided into two hours a week of regular gymnasium work and one hour of interpretative dancing, folk dancing, games, tennis, hockey, basket ball, or swimming. Classes are in part held out of doors when the weather permits.

152A. PHYSICAL EDUCATION W-II. Freshman year, second semester. Gymnasium, three hours. One semester credit. Prerequisite: Physical Education W-I. Assistant Professor Bond, Miss Tausche, and Miss Evans.

In this course the marching tactics, floor work, etc., are continued for two hours a week, and basket ball, games, interpretative dancing, folk dancing, tennis, and swimming are carried on for one hour a week.

153, 154. PHYSICAL EDUCATION W-III AND W-IV. Sophomore year, first and second semesters, respectively. Gymnasium, three hours. One semester credit. Assistant Professor Bond and Miss Tausche.

The work in these two courses is a continuation of that of courses 151A and 152A. More advanced work in marching tactics and apparatus is here given.

175. GYMNASTICS. Elective, summer school. Lectures and recitations, one and one-half hours; practical work, three hours. One semester credit. Assistant Professor Bond.

This course is especially planned for the needs of the teacher in the public schools where no special teacher in this subject is employed. Lectures are given on the general theory of gymnastics and the physiological reason for each exercise. A notebook is required.

Practical Work.—The practical work includes free exercises, hand apparatus, heavy apparatus, and practice teaching.

178. FOLK DANCING. Elective, summer school. Lectures and recitations, one hour; practical work, four hours. One semester credit. Assistant Professor Bond.

Lectures are given on the physiological benefit derived from the dances, in costuming, and in the use of the dances in festivals and fetes. A notebook is required.

Practical Work.—This course offers graded folk dances of the different nations, suitable for use in schoolrooms, playgrounds, or gymnasiums.

181. GAMES. Elective, summer school. Lectures and recitations, one hour; practical work, four hours. One semester credit. Assistant Professor Bond.

Lectures are given on the problems of grading games, and on the physiological benefits received. A notebook is required.

Practical Work.—This course offers practice in games for grammar schools, high schools, playground and gymnasiums.

182. PLAYGROUND MANAGEMENT. Elective, summer school. Lectures and recitations, one hour; practical work, to be arranged. One semester credit. Assistant Professor Bond.

This course includes discussions of the organization and administration of playground activities and equipment, and practical experience in conducting such activities.

185. INTERPRETATIVE DANCING. Elective, summer school. Class work and practical work, five hours. One semester credit. Assistant Professor Bond.

This course aims to teach dancing, not dances, through logical, conscious control of body movements, motivated by music which has been studied and is understood. This study of music includes the simple, common rhythms, which are easily adapted to many uses.

187. TECHNIC OF BASKET BALL, BASEBALL, AND HOCKEY. Elective, summer school. Lectures and recitations, three hours. One semester credit. Assistant Professor Bond.

This course is devoted to the technique of these sports, the physiological benefit derived, and the organization of each into interclass contests.

190. SWIMMING W. Open to all women students of the College. Both semesters. No credit. Miss Tausche.

This is a course in swimming in which individual instruction is given in several styles of swimming and diving.

Physics

Professor HAMILTON
Professor RABURN
Associate Professor FLOYD
Assistant Professor CONVERSE

Assistant Professor BRACKETT
Assistant Professor HARTEL
Instructor TAYLOR
Instructor CUMMINGS

Recognizing the need of a thorough knowledge of the fundamental laws and principles involved in all physical changes, provision has been made, in the courses which follow, for both a theoretical and a practical treatment of the subject. Instruction is based upon the facts given in selected textbooks, and these topics are enlarged upon by lectures and illustrated by experimental demonstrations. The purpose is to give a training in exact reasoning, and a knowledge of principles that will be factors in the solution of problems in all branches of science as well as in everyday life.

The laboratory work which accompanies the courses in physics gives a student abundant opportunity to test the principal laws of the science; and, since he is expected to arrange and operate the apparatus, the work should enable him to acquire skill in manipulation, precision of judgment, and care in the use of delicate instruments. The laboratories are well

arranged for the work, and the equipment provided is of a nature adapted to meet the requirement of accurate work in all courses. The manual in use in most of the courses is one prepared by the department to meet the exact conditions and equipment of the laboratory.

COURSES IN PHYSICS

FOR UNDERGRADUATES

101. HOUSEHOLD PHYSICS. Freshman year, both semesters. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: One year of high-school physics or its equivalent. Professor Hamilton, Associate Professor Floyd.

This course consists of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light, with its color phenomena and actinic effects; of some of the optical instruments used in scientific work; a study of electric lighting, and illumination, and of cost of operating many of the appliances used in the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliances and of the operator.

111. AGRICULTURAL PHYSICS. Sophomore year, first semester. Class work, three hours. Three semester credits. Professor Raburn, Assistant Professor Converse.

This course includes a series of lectures and class demonstrations based upon heat, light, and electricity as involved in influencing farm life. The elementary factors of weather and weather forecasting are explained, and access is given to the weather records and apparatus of the College weather station. The work in light emphasizes the value of light in plant growth, in spectrum analysis, and in many of the natural phenomena. Electricity is presented in such a manner that the student may gain a working knowledge of the various electrical appliances that can be used on the farm. Text: Spinney's *A Textbook of Physics*.

120. PHOTOGRAPHY. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Training in physics and chemistry. Professor Hamilton.

The importance of a record of exact details, as shown in a photograph, makes this work valuable to all scientists. The course gives the student some knowledge of the chemical and physical principles involved in the art, as well as practice in making good negatives and prints. The lecture and laboratory work deals with: Things to be considered in selecting a camera; proper exposures; composition of pictures; proper development of plates; tests of different developers; retouching; reducing and intensifying negatives; printing and mounting; making lantern slides, bromide enlargement, and the prints best adapted for illustrated articles in newspapers and magazines.

130. WIRELESS TELEGRAPHY. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Elementary Physics. Professor Hamilton.

The work includes a study of the most efficient types of receiving and transmission sets, a study of the fundamental principles of electric waves, and of the most important points to be observed in the erection of a good plant.

Laboratory.—The student learns in the laboratory to receive and to transmit messages, and as he learns the code he is instructed in field work.

135. GENERAL PHYSICS I. Sophomore year, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisites: Elementary Physics and Plane Trigonometry. Professor Raburn, Associate Professor Floyd.

This course, like the one following, is provided for those intending to specialize in scientific lines. It covers, in as thorough a manner as possible, the general principles involved in mechanics, sound, and heat. Text: Reed and Guthe's *College Physics*.

Laboratory.—The work is based upon laws and principles discussed in the classroom, and is so arranged that the students may have a practical illustration of the facts learned.

140. GENERAL PHYSICS II. Sophomore year, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: General Physics I. Professor Raburn, Associate Professor Floyd.

This course includes a study of the theory of electricity and light. The class follows the subject as outlined in the text, but special emphasis is placed upon those parts that have an immediate bearing on the work of other sciences, such as electrolysis, thermal effects, relation of electrical and mechanical energy. Text: Reed and Guthe's *College Physics*.

Laboratory.—The work follows the subjects presented in the class and is conducted with a grade of apparatus that gives training in the use of the better class of instruments employed in scientific investigations.

145. ENGINEERING PHYSICS I. Sophomore year, both semesters. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Elementary Physics and Plane Trigonometry. Professor Hamilton, Professor Raburn, Assistant Professor Brackett.

This course in mechanics, sound and heat is intended to give the engineering students as thorough a working knowledge as possible of the fundamental units and laws involved in force, work, power, and energy; also the laws of simple machines, gases, and liquids as they occur in the transformation of force and energy. Text: Kimball's *College Physics*.

Laboratory.—The work consists of the use of apparatus to test the laws of inertia, moments of force, moments of torsion, elasticity, and rigidity, and other laws and principles involved in mechanics and heat. Accurate measurements and carefully recorded data are required.

150. ENGINEERING PHYSICS II. Sophomore year, both semesters. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisite: Engineering Physics I. Professor Hamilton, Professor Raburn, Assistant Professor Brackett.

This course treats of electricity and light. The work in electricity is of such a nature as to give the student working knowledge of the units employed, and of the fundamental laws; and to acquaint him with methods of producing a current, its uses, and the system by which electrical energy is measured. The principal phenomena of light, together with the laws that may have direct bearing upon light as a standard and method of measurement, are treated in this course. Text: Kimball's *College Physics*.

Laboratory.—The electrical work in this course includes measurements of resistances, a study of primary cells, and the transformation of mechanical into electrical energy. The work of light consists of a study of the laws of reflection, and refraction, and measurements of wave lengths by means of the spectroscope, the use of the interferometer, and photometry.

FOR GRADUATES AND UNDERGRADUATES

213. ACOUSTICS. Elective, first semester. Class work, one hour. One semester credit. Prerequisite: Engineering Physics II. Associate Professor Floyd, Assistant Professor Brackett.

In this course a special study is made of the acoustic properties of buildings, of the architectural defects which give rise to poor acoustics, with a study of special methods used to avoid such troubles in construction of buildings or to correct them in constructed buildings.

221. **MOLECULAR PHYSICS.** Elective, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisites: College Physics and College Chemistry. Associate Professor Floyd, Assistant Professor Brackett.

This course includes a study of molecular kinetics of gases, liquids and solids; liquid-gas systems; crystal-gas systems; crystal-liquid systems; Brownian movement; solutions, osmosis, and electrolytic conduction.

Laboratory.—The laboratory work is based on the theory as given in the class work, and includes the determination of capillary constants, molecular conductivities, percentage ionization, and specific heats of gases.

222. **HARMONICS.** Elective, second semester. Class work, two hours. Two semester credits. Prerequisites: One year each of music and elementary physics. Professor Hamilton, Associate Professor Floyd.

This course is given to students of music so that they may learn the fundamental principles of sound that are associated with harmony. It is a lecture and demonstration course that deals with many facts of interest relating to the construction of scales and chords. A clearer understanding of composition and of tone quality may be had if the physical laws of sound are understood.

223. **PHYSICAL MEASUREMENTS.** Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Professor Hamilton, Associate Professor Floyd.

The class work is based upon principles that are involved in instruments for accurate measurements. The instruments described and used are typical ones employed in measurements of mechanical forces, heat, and electricity. Part of the class work is the development of formulas.

Laboratory.—The work is so selected as to give the widest possible range in the variety of instruments used and of principles illustrated.

224. **SPECIAL METHODS IN THE TEACHING OF PHYSICS.** Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. For credit towards the state teachers' certificate this must be taken in the student's senior year. Prerequisites: Educational Psychology and College Physics. Associate Professor Floyd, Assistant Professor Converse.

This course is intended for those who are either teaching or expecting to teach physics in secondary schools. The class work includes an analysis of the present status of physics and of physics instruction in our high schools, and is based upon a critical study of the state text as well as other modern texts that may be used as reference. Special effort is made to vitalize the work and to make it apply to everyday life. Lectures, library work, demonstrations and practice teaching are used as methods of directing the course.

Laboratory.—The laboratory work includes the formation and adaptation of courses suitable for either rural or city high schools.

230. **SPECTROSCOPY.** Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: College Physics and College Chemistry. Professor Raburn, Associate Professor Floyd.

This is an advanced course in light, intended to cover the theory and use of the spectroscope and spectrometer as instruments for identifying elements or their compounds, when rendered incandescent, by means of their characteristic spectra or definite wave lengths.

Laboratory.—The laboratory work consists of calibration of prisms and gratings for ready use in chemical laboratories and also gives ample training in measuring wave lengths and in identifying the spectra of many substances.

233. RADIO-ACTIVITY AND ELECTRON THEORY. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: College Physics and College Chemistry. Professors Hamilton and Rabin.

The nature of the electron and its behavior in electric and magnetic fields, are studied. Temperature effects and behavior of the electron in cathode tubes using a hot cathode are discussed and studied in detail. The methods of determining the mass and velocity of electrons is developed from the historical standpoint. A study is made of the nature and effects of the various rays, including x-rays and ultra-violet rays and the emanations from the known radioactive substances.

Public Speaking

Professor EMERSON†
Associate Professor HILL
Instructor BOWMAN*

It is the constant effort of the Department of Public Speaking to relate the training in public speaking with the work of all the other departments of the College; to harmonize it with the spirit of the College, which is distinctly technical and industrial. With this object in view, students are trained in the presentation and discussion of the valuable ideas acquired in their various fields of study. The method pursued in this training is that of actual practice on the platform before an audience. Conviction, not entertainment, is the dominant purpose in every case.

The department seeks to place itself at the service of those various organizations of the College which desire or need its assistance. In addition to its regular courses it aims to make itself available as far as possible for individual rehearsals; for the training of the orators of the College; and for the directing and coaching of plays. Students are urged to ally themselves with the organizations representing these various activities.

COURSES IN PUBLIC SPEAKING

FOR UNDERGRADUATES

101. PUBLIC SPEAKING I. Elective, both semesters. Class work, two hours. Two semester credits. Associate Professor Hill and Mrs. Bowman.

The purpose of this course is to enable the student to attain some proficiency in the art of oral interpretation. The training given seeks to develop a natural style. In connection with the practice work upon the platform the student is given such points of theory and such routine drill as are necessary for the development and use of the voice and for proper platform deportment.

102. PUBLIC SPEAKING II. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Public Speaking I, or by arrangement with the head of the department. Associate Professor Hill and Mrs. Bowman.

* Temporary appointment.

† Absent on leave, February 15 to June 30, 1921.

This course is a continuation of Public Speaking I, and involves a more advanced study of the art of oral interpretation.

106. EXTEMPORE SPEECH I. Freshman and junior years and elective, both semesters. Class work, two hours. Two semester credits. Professor Emerson and Associate Professor Hill.

The work of this course consists in the preparation and delivery of short addresses based on prepared outlines. Careful preparation of material is required. The plan of the speech is made in advance, but the choice of language is left for the moment of speaking. Criticism and points of theory given by the instructor supplement the course.

108. EXTEMPORE SPEECH II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Extempore Speech I, or its equivalent. Professor Emerson and Associate Professor Hill.

This course is a continuation of Extempore Speech I. The same methods are pursued but special attention is given to the telling of humorous stories, to after-dinner speaking, and the like.

110. ADVANCED PUBLIC SPEAKING. Elective, second semester. One semester credit. Prerequisites: Extempore Speech I and II, or by special arrangement with the head of the department. Professor Emerson and Associate Professor Hill.

In this course the work consists of the preparation and delivery by the student of one extended lecture-recital, lecture, or address during the semester. This is supplemented by class lectures and practice, and by a study of types. It may include the preparation and delivery of institute talks, or addresses suitable for extension work.

Zoology

Professor NABOURS
Professor ACKERT
Associate Professor HARMAN
Assistant Professor HISAW
Instructor BROWN

Instructor CLEVELAND
Instructor ROGERS
Assistant HUSE
Assistant WEST

The courses have been planned to give a fundamental knowledge of the structures, functions and relations of animals; information concerning the manner in which animals respond to the conditions of the environment; an appreciation of their human values; and a consideration of the problem of heredity and evolution.

The courses in General Zoölogy (101 and 102, and 105) constitute a general survey, and form an excellent introduction to all lines in agriculture, general science, and home economics. Embryology (117), Cytology (214), Advanced Mamalian Embryology (220), Parasitology (123), Evolution and Heredity (217), and Paleontology (Geology 201) are preliminary to advanced work in animal breeding, animal husbandry, dairy husbandry and veterinary medicine. Selections may be made among these courses and Advanced Zoölogy (201, 202), Invertebrate and Vertebrate Taxonomy (205, 208), Economic Zoölogy (126), Ecology (211), Embryology and Physiology (108), Zoölogical Problems (203), Research in Zoölogy (301), and the Seminar (227), by those who expect to do advanced work in zoölogy or entomology, or become teachers of biology.

The classrooms and laboratories are equipped with charts, models, microscopic binoculars, microtomes, paraffin baths and other apparatus both for elementary and advanced work, and a good natural-history museum is available.

COURSES IN ZOOLOGY

FOR UNDERGRADUATES

101 and 102. GENERAL ZOÖLOGY I AND II. Sophomore year and elective, first and second semesters, respectively. Class work, two hours; laboratory, three hours. Three semester credits for each course. Professor Nabours, Professor Ackert, Associate Professor Harman, Assistant Professor Hisaw, Miss Brown, Mr. Cleveland, Miss Huse and Mrs. West.

In General Zoölogy I an elementary study is made of the structures and functions of types selected to illustrate the invertebrates; in course 102 an elementary study is made of the structures and functions of types selected to illustrate the development of the phylum chordata.

Laboratory.—The form and activities of animals are observed both in the field and in the vivaria, and important systems of those animals selected as types are dissected and sketched.

105. GENERAL ZOÖLOGY. Sophomore year, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Men and women in separate classes. Professor Nabours, Professor Ackert, Associate Professor Harman, Assistant Professor Hisaw, Miss Brown, Mr. Rogers, Mr. Martin, Miss Huse and Mrs. West.

The structures and functions of types of both invertebrates and vertebrates are studied.

Laboratory.—Studies of the form and function of types of living animals, and dissection and reconstruction of the important systems of selected types.

108. EMBRYOLOGY AND PHYSIOLOGY. Sophomore year and elective, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisites: Zoöl. 105 or equivalent, and Chem. 121. Professor Nabours, Professor Ackert, Associate Professor Harman, Miss Brown, and Miss Huse.

The first three-fifths of the semester is devoted to (a) embryology and the remaining two-fifths to (b) human physiology. The course thus falls into two closely related parts: (a) a study of the development of the germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth with special reference to the human species; and (b) a study of the functions of the organs and systems of the human body, with special consideration of the digestive, respiratory, circulatory, nervous, and urinogenital systems and organs of special sense.

Laboratory.—The laboratory work includes: (a) studies of the male and female germ cells, stages in the process of fertilization, the segmenting ovum, and whole mounts and serial sections of the chick and pig embryos in several stages of development, with demonstrations of types of mammalian foetal relations; and (b) experiments for the demonstration of the composition and functions of bone, blood, lymph, and the reaction of muscles, nerves, parts of the digestive, respiratory, excretory and other systems.

111. GENERAL ZOÖLOGY, VET. Freshman year, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Given concurrently with Anat. 101. Professor Ackert, Assistant Professor Hisaw.

A general study is made of the forms in the animal kingdom, with attention given to classification, distribution, habitats, and relation to each other and to man.

Laboratory.—The form and activities of animals are observed in the field, vivaria and the museum, and a comparative study of the systems of organs in a few selected types is made.

114. EMBRYOLOGY, VET. Freshman year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Given concurrently with Anat. 106. Prerequisites: Zoöl. 111 and Anat. 101. Professor Ackert, Assistant Professor Hisaw.

The origin of the germ cells, fertilization, the establishment of relations between the uterus and embryo, the development of membranes, and the nutrition of the foetus in mammals are considered briefly.

Laboratory.—Exercises in the reconstruction of organs and systems from sections and dissections in the chick and pig embryos, and of foetal relations in mammals.

117. EMBRYOLOGY. Junior and elective, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Zoöl. 101 and 102, or 105. Professor Nabours, Professor Ackert, Associate Professor Harman, and Assistant Professor Hisaw.

The development of the germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth in mammals are studied in this course.

Laboratory.—Studies of the male and female germ cells, stages in the processes of fertilization, the segmenting ovum, and whole mounts, serial sections, and reconstruction of the chick and pig embryos in several stages of growth, with demonstration of types of mammalian foetal relations form the subject matter of the laboratory investigation.

123. PARASITOLOGY. Senior year and elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Courses 101 and 102. Professor Ackert.

A study is made of the biology, life histories, and economic importance of the external and internal parasites of the domestic animals and man.

Laboratory.—The structural and functional adaptations of selected types of parasites are studied in the laboratory.

126. ECONOMIC ZOÖLOGY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ackert.

The bird and mammal groups are studied comprehensively. Specimens in the museum are used extensively.

Laboratory.—The laboratory work comprises largely three-hour field trips to a number of selected areas: woods, streams, meadows, College campus, and farm. This work includes identification of birds and mammals, with special studies of their migration, adaptation, and economic importance.

FOR GRADUATES AND UNDERGRADUATES.

201. ADVANCED INVERTEBRATE ZOÖLOGY. Elective, first semester. Class work, two hours; laboratory, six hours. Four semester credits. Prerequisite: Zoöl. 101 and 102, or 105. Professor Ackert.

A comprehensive study is made of representatives of the invertebrates, from the standpoints of behavior, comparative anatomy, development, and phylogeny. Representatives of the invertebrate groups are studied from the morphological aspect.

202. ADVANCED VERTEBRATE ZOÖLOGY. Elective, second semester. Class work, two hours; laboratory, six hours. Four semester credits. Prerequisite: Zoöl. 101 and 102, or 105. Professor Ackert.

The behavior, comparative anatomy, development, and phylogeny are studied, giving a comprehensive view of the chordates. A study is made of the anatomy and morphology of certain representative vertebrates.

203. ZOÖLOGICAL PROBLEMS. Elective, both semesters. One or two semester credits. Prerequisites: Consult instructors. Professor Nabours, Professor Ackert, Associate Professor Harman, and Assistant Professor Hisaw.

Individual problems in heredity, parasitology, cytology, embryology, and ecology are assigned by the instructors in charge.

205. TAXONOMY OF INVERTEBRATES. Elective, first or second semester. Laboratory, nine hours. Three semester credits. Prerequisites: Courses 101 and 102, or 105; and Ent. 216, concurrently. Assistant Professor Hisaw.

Practice is had in the use of the keys for the identification of species, and emphasis is placed on familiarity with the literature of invertebrate taxonomy, except insects, and on the identification of species in the local fauna.

208. TAXONOMY OF VERTEBRATES. Elective, first or second semester. Laboratory, nine hours. Three semester credits. Prerequisites: Zoöl. 101 and 102, or 105; and Ent. 216, concurrently. Assistant Professor Hisaw.

This course is similar to course 205, with the difference that vertebrates instead of invertebrates are studied.

211. ANIMAL ECOLOGY. Elective, second semester. Lectures, one hour; laboratory and field work, six hours. Three semester credits. Prerequisites: Zoöl. 101 and 102, or 105, and Ent. 101. Assistant Professor Hisaw.

This course deals with the relation of animals to the complete environment. The associational method of study is used and the subject is considered from the descriptive, comparative and explanatory standpoints. Special attention is given to the dynamic factors of the environment and their effect on the present status and future changes of the animal community. The field work gives practice in the methods of field ecology and deals with the application of general principles to local conditions. The fundamental principles and other general aspects of the science are presented in the form of lectures.

214. CYTOLOGY. Elective, first semester. Lecture, two hours; laboratory, six hours. Four semester credits. Prerequisite: Zoöl. 108, 117, or equivalent. Associate Professor Harman.

Methods of preparing material for microscopical study; killing, fixing, staining, and sectioning; the development of the germ cells; and theories of structure and functions of the different parts of the cell are matters considered in this course. The work forms a basis for studies of heredity and related subjects.

217. EVOLUTION AND HEREDITY. Elective, second semester. Lecture, two hours; library reference reading and reports, three or six hours. Three or four semester credits. Prerequisites: Consult instructor. Professor Nabours.

This is a lecture and reading course dealing with the development of the idea of evolution; the evidence and the principal theories of the causes; problems of variation, heredity, and experimental evolution.

220. ADVANCED MAMMALIAN EMBRYOLOGY. Elective, second semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisites: Zoöl. 108, 114 or 117, or the equivalent. Associate Professor Harman.

The course consists of further study of the main facts of embryology, with special reference to their bearing upon biological theories, the consideration of embryological problems, and a comparative study of the physiology of reproduction in mammals, including man.

225. ZOÖLOGY AND ENTOMOLOGY SEMINAR. Elective, both semesters. One two-hour session a week. One credit. Subject matter changes each semester. Prerequisite: Consult seminar committee.

This course consists in the presentation of original investigations, reviews of papers appearing in current journals, summaries of recent advances in the various fields, and discussions of the various aspects of the fundamental problems of modern biology.

227. **GENETICS SEMINAR.** Elective, both semesters. One semester credit. For prerequisites, consult instructors. Professor Nabours, Professor Lippincott, Associate Professor Parker and Assistant Professor Ibsen.

This course continues through the first and second semesters and includes the study and criticism of genetic experiments in plants and animals, the biological and mathematical methods employed, and validity of conclusions drawn.

FOR GRADUATES

301. **RESEARCH IN ZOÖLOGY.** Elective, both semesters and during the summer. One to five semester credits. Prerequisites: Consult instructors. Professor Nabours, Professor Ackert, Associate Professor Harman, and Assistant Professor Hisaw.

Individual research problems in heredity and experimental evolution, parasitology, cytology, embryology, and ecology are assigned.

Special Courses for Teachers

At the present time teaching of vocational subjects in the public schools is undergoing great development. Many schools are introducing manual training, agriculture, food and nutrition and clothing and textiles, and many others are extending the work hitherto given. The state law requiring the teaching of agriculture in the rural schools is also creating a strong movement in the same direction. There is an active demand for teachers who can handle such work successfully.

The College offers to graduates of other institutions, and indeed to all who have studied such subjects as may be prerequisite, unexcelled facilities for securing training in the industrial subjects indicated. Courses extending over one or two years may be arranged by means of which the student who is already prepared in English, mathematics, and to a certain extent in the sciences, may prepare himself to enter a broader and, frequently, a more remunerative field.

Nos. 31, 32, 33, 35, 36 and 37, on pages 217, 218 and 219, exhibit groupings that illustrate the possibilities in work of this character, and other arrangements may be made. Those taking such courses will be cared for in the regular classes provided for other students, and no limitation is imposed except that the prerequisites for any subject must have been taken previously, here or elsewhere. These prerequisites are stated in this catalogue in connection with the description of each subject. The catalogue also shows the semester in which a subject is regularly given.

The conditions and requirements for the different classes of state certificates are stated in the introductory paragraphs for the Department of Education, page 244.

The course for persons who wish to prepare for teaching vocational agriculture under the Smith-Hughes law is outlined under the Division of Agriculture, page 86, and the course for those wishing to qualify as teachers of vocational home economics, under the same law, is given on page 189, under the Division of Home Economics.

Kansas State Agricultural College Summer School

June 3 to August 5, 1921

EDWIN LEE HOLTON, *Dean*.

PURPOSE

There is no larger or better equipped plant devoted to the teaching of agriculture, home economics, mechanic arts, and related subjects than Kansas has in her State Agricultural College. In order that this plant may not remain idle during the summer months, the Board of Administration authorized the organization of a Summer School. The College is authorized by an act of Congress to expend each year a portion of the national appropriation for "providing courses for the special preparation of instructors for teaching the elements of agriculture and mechanic arts."

Each year there is an increasing demand for trained teachers of agriculture, shop work, mathematics, the sciences, and home economics. The College has not been able to supply this demand. The Summer School offers an opportunity for experienced teachers to prepare themselves to meet the new demand placed upon the public schools, viz.: Preparing boys and girls for vocational and social efficiency.

ADVANTAGES AT KANSAS STATE AGRICULTURAL COLLEGE

There is a growing conviction among the leading educators that the best institution in which to train teachers of vocational subjects is a well-equipped technical college, where the courses of study are pointed towards the producing vocations. The Kansas State Agricultural College is such an institution.

The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens and experimental fields. Broad, macadamized, and well shaded avenues lead to all parts of the campus. Including the campus of 160 acres, the College owns 1,136 acres of land. Outside the campus proper, all the land is devoted to practical and experimental work in agriculture. Within the College grounds most of the space not occupied by buildings or needed for drives and ornamental planting is devoted to orchards, forest and fruit nurseries, vineyards, and gardens.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of attractive white limestone obtained from the College quarries. The College owns and operates its own system of waterworks, and is provided with a complete sewerage system.

The library is open during the summer and its valuable collection of books, periodicals, bulletins, and reports is placed at the service of the Summer School students.

EXPENSES

Tuition is free. A Summer School fee of \$10 is charged all students whose homes are in Kansas. For nonresidents of the state a matriculation fee of \$15 is charged. Each student pays also a sick-benefit fee of \$1.50. Receipts for these fees must be presented before enrollment in the Summer School classes.

Table board varies from \$5 to \$7 a week. Three meals a day, except on Sunday, are served at the College cafeteria in Kedzie Hall. Room rent ranges from \$10 to \$18 per month. The College Young Men's Christian Association offers accommodation in its building for a limited number of men students at prices ranging from \$10 to \$12 a month. The cost of rooms is reduced by half where two students room together.

REGISTRATION AND LATE REGISTRATION

Registration will take place in Nichols Gymnasium from eight until five o'clock on the opening day, Friday, June 3. No one will be allowed to register for full-time work after Friday, June 17. All class and laboratory work begins with the first period, Saturday, June 4.

COLLEGE CREDITS AND VISITING PRIVILEGES

Full College credit will be given for all courses satisfactorily completed by regularly matriculated students unless otherwise specified in the announcement of courses. Students desiring College credit will not be allowed to carry more than nine semester credit hours of work, except upon written approval of the dean of the Summer School and of the dean particularly concerned. In exceptional cases and when approved as above, undergraduate students may carry not to exceed ten semester credit hours. Graduates of colleges may carry for graduate credit nine semester hours; in exceptional cases they may carry twelve semester hours, subject to the approval of the dean of the Summer Session and of the dean particularly concerned.

Students not caring for credit toward a degree, may, upon showing a receipt for Summer School fees, be given a visitor's card, which will admit them to any courses offered. They should, however, make out class cards for any courses which they wish seriously to pursue. A limited visiting privilege may be granted to any student by the dean.

CONVOCATION AND COLLEGE LECTURES

From time to time, as announced, classes will be displaced for an hour for special lectures, musical or literary exercises. During the Summer Session lecturers of note, specialists in their particular fields, will lecture before the Summer School.

At other times the program will be musical or literary in nature. These numbers are furnished by the Summer School music staff, by visiting artists, and by members of the Summer School chorus and orchestra. Every student with musical ability is urged to join one of the musical organizations.

RECREATION AND AMUSEMENT

A part of the attraction of the Summer School session is the opportunity for recreation and social environment. The vicinity of Manhattan is rich in features of interest for "hikes." Usually lunch is carried and supper eaten on these trips. The agronomy or experimental farm is visited on one of these trips; the serum plant and live-stock barns are visited on another. Other hikes are made to places of natural interest. Fort Riley is only forty-five minutes distant by trolley, and a trip to the fort makes an enjoyable and instructive outing.

"Community" sings, and folk games are held. There is a play time when all members of the Summer School may spend an hour in real play. Baseball, hockey, tennis, swimming, and other sports are carried on.

For those who appreciate opportunities for literary and forensic improvement, combined with social good times, the Summer School Literary Society meets Saturday evening of each week and is open to all students.

Courses in the Summer School

Division of Agriculture

F. D. FARRELL, Dean

AGRONOMY

Professor THROCKMORTON
Assistant Professor ZAHNLEY
Instructor LYONS

52. **ELEMENTARY AGRICULTURE.** Class work, first hour, M Tu W Th F S, Ag 84. Laboratory, fifth, sixth and seventh hours, W F, Ag 81. Four semester credits in School of Agriculture. Assistant Professor Davidson.

This is a general course planned for teachers of public schools who teach one year of agriculture. It covers the entire field of general agriculture, together with suggested outlines for a year's work in the laboratory. Texts: *Waters' Essentials of Agriculture*, and Call and Schafer's *Manual of Agriculture*.

102. **FORAGE CROP PRODUCTION.** Class work, second hour, Tu W Th F, Ag 83. Laboratory, fifth, sixth and seventh hours, Tu Th, Ag 78. Three semester credits. Prerequisite: Botany 101. Assistant Professor Zahnley.

This course is a study of the distribution, relative importance, value and production of forage crops, including sorghums, alfalfa, clover and the grasses.

120. **TEACHERS' COURSE IN SOILS AND CROPS.** Class work, third hour, Tu W Th F, Ag 83. Laboratory, fifth, sixth and seventh hours, M S, Ag 53. Three semester credits. Assistant Professor Zahnley.

This course is designed primarily for young women preparing to teach the one-year course in agriculture offered in many Kansas high schools. This course deals with the origin and formation, texture and composition of soils; the management of soils to maintain fertility; and the adaptation of soils to crops. It also deals with the distribution, relative importance, and production of such grain crops as wheat, corn, kafir, oats, barley, and rye; and such forage crops as sorghum, alfalfa, clover and grasses.

132. **SOIL FERTILITY.** Class work, first hour, Tu W Th F, Ag 63. Laboratory, fifth, sixth and seventh hours, W F, Ag 53. Three semester credits. Prerequisites: Chemistry 150, and Agronomy 131. Professor Throckmorton and Instructor Lyons.

Factors influencing the fertility of the soil, the effect of different systems of farming on soil fertility, and the management of soils to conserve fertility receive most attention in this course.

ANIMAL HUSBANDRY

Professor McCAMPBELL
Associate Professor PATERSON

170. **TEACHERS' COURSE IN ANIMAL HUSBANDRY.** Class work, first hour, M Tu W Th F S; laboratory work, third and fourth hours, M W F. Four semester credits. Professor McCampbell and Associate Professor Paterson.

This course is planned especially to meet the needs of teachers who desire a general rather than a special course in animal husbandry. The work in the classroom embraces the following:

a. Feeding principles and practices, three weeks. Text: Henry and Morrison's *Feeds and Feeding*.

b. History of breeds and pedigrees, two weeks. Text: Plumb's *Types and Breeds of Live Stock*.

c. Breeding principles and practices, two weeks. Text: Mumford's *Breeding Farm Animals*.

d. Housing, barns, sanitation, herd and flock management, fitting for shows, sale management, etc., two weeks. Lectures.

Laboratory.—The first seven weeks are devoted to judging; the last two weeks are given to meat demonstrations.

DAIRY HUSBANDRY

Associate Professor CAVE
Assistant Professor MAXEY

101. ELEMENTS OF DAIRYING. Class work, fourth hour, Tu W Th F, D 30. Laboratory, fifth, sixth and seventh hours, Tu Th, D 28. Three semester credits. Assistant Professor Maxey.

This is a general course in dairying, dealing with the secretion, composition and properties of milk, care of milk and cream on the farm, a study of the different methods of creaming, construction and operation of farm separators; principles and application of the Babcock test; use of the lactometer; and buttermaking on the farm. Lectures are supplemented by textbook work.

Laboratory.—Practice is given in operating the Babcock test and lactometer, in separation of milk, and in farm buttermaking.

104. DAIRY JUDGING. Laboratory, 8:30 to 9:55, Tu W Th F, Pavilion. Two semester credits. Associate Professor Cave.

Dairy stock is judged from the standpoint of economical production and breed type. Score cards are used to teach the student to become accurate, thorough and systematic in the selection of animals as representatives of breeds or for breeding purposes.

HORTICULTURE

Professor BARNETT
Instructor PICKETT
Instructor _____

101. PLANT PROPAGATION. Class work, first hour, M Tu W Th; laboratory, fifth, sixth, and seventh hours, Tu Th. Three semester credits. Prerequisite: Plant Anatomy. Instructor Pickett.

The following are discussed: Natural and cultural methods of plant propagation; seeds, seed testing, and seed growing; treatment given to different classes of seeds; the production of seedlings for stocks, grafting, budding, layering, making cuttings, and the special requirements necessary in propagating commercial fruits and ornamental plants. Instruction is by lectures and assigned readings.

Laboratory.—Practical work is given in preparation of seeds, seed testing, the preparation of seed beds, the use of seeding machinery, transplanter, grafting, budding, and general nursery practice.

125a. LANDSCAPE GARDENING. Class work, third hour, M Tu W Th. Two semester credits. Instructor _____.

Lectures are given on the principles of landscape art and the means of their application to the problems of improving lawns, yards, country

homes, school grounds, and public parks. Opportunity is presented the student to become acquainted with plant materials that are best adapted to Kansas conditions.

134. ORCHARDING. Class work, second hour, M Tu W-Th. Two semester credits. Professor Barnett.

In this course a consideration is given to the best practices in the production of the deciduous tree fruits. The location of the orchard, maintenance of soil fertility, protection from frost, choice of varieties, control of orchard pests and the harvesting, storage and marketing of the fruits are among the important subjects considered. Though not formally required, a knowledge of elementary botany and chemistry will be of great aid to the student in this course.

137. MARKET GARDENING. Class work, second hour, Tu W Th F; laboratory, fifth, sixth, and seventh hours, M W. Three semester credits. Instructor ———.

In this course a comprehensive study is made of vegetable gardening; and soil improvement, the value and use of fertilizers, marketing, and storage are given special attention.

Laboratory.—The laboratory work consists of the preparation of the plans for gardens; seed testing; construction of the hotbed; the use of tools and machinery; and practical work in the student's own practice garden.

POULTRY HUSBANDRY

Professor LIPPINCOTT
Associate Professor PAYNE

101. FARM POULTRY PRODUCTION. Class work, second hour, W F, Ag 39. Laboratory, fifth and sixth hours, Tu Th, Poultry Farm. Two semester credits. Professor Lippincott and Associate Professor Payne.

This course takes up the problems of poultry management on the general farm. The subjects of feeding, breeding, incubating, brooding, and preparing for market are studied.

120. TEACHERS' COURSE IN POULTRY HUSBANDRY. Class work, first hour, W F, Ag 39. One semester credit. Professor Lippincott and Associate Professor Payne.

This course takes up the problems of poultry management for egg and meat production. The subjects of feeding, breeding, housing, incubation, brooding, and preparing poultry for market are studied.

Division of Veterinary Medicine

R. R. DYKSTRA, Dean

ANATOMY AND PHYSIOLOGY

Professor BURT

213. **PHYSIOLOGY.** Class work, fourth hour, M Tu W Th F S. **Three semester credits.** Professor Burt.

The work in this course consists of the study of the skeletal tissues, the circulatory, digestive, respiratory and other systems, in much the same manner as is done during the regular college course. The lectures are supplemented with demonstrations and experiments. Dissected specimens are used as often as possible instead of papier-maché models. The laboratory is well equipped with physiological apparatus. This apparatus is freely employed and its application explained. The demonstrations and experiments are especially helpful to those engaged in teaching and those intending to teach this subject. Credit in this course is the same as the credit in Human Physiology. This course may be substituted for Animal Physiology. Text: Martin's *Human Body*. References are also made to Howell's *Text Book on Human Physiology*, and others. Teachers are recommended to use the text by Howell.

SURGERY AND MEDICINE

Assistant Professor FRICK

190. **FARM ANIMALS IN HEALTH AND DISEASE.** Class work, third hour, M Tu W Th F S. **Three semester credits.** Doctor Frick.

In this course the common diseases of domesticated animals are discussed, and particular attention is devoted to first-aid treatment, preventive measures against the spread of contagious and infectious diseases, methods of taking temperatures, counting the pulse and respirations, modes of administering drugs, bandaging, etc. Various aids to correct diagnoses, particularly tuberculin testing of dairy and beef animals, are taken up. A few lectures on the more commonly used medicines are included. When clinical cases are available, they are used to visualize the instruction given in the classroom. This is a course for teachers and students preparing to teach vocational agriculture.

Division of Engineering

R. A. SEATON, Dean

APPLIED MECHANICS AND MECHANICAL DRAWING

Associate Professor PEARCE
Assistant Professor WOJTAZAK

98, 99. MECHANICAL DRAWING FOR HIGH SCHOOLS. Lectures and recitations, third hour, M S; drafting, fifth, sixth, and seventh hours, T Th or W F. Three semester credits in the School of Agriculture. Associate Professor Pearce.

A course intended for high-school teachers of mechanical drawing and for those desiring to make College entrance credits. The work of the course will be varied to suit the previous training of those who register for it. A study is made of drawing instruments and materials, drawing-room practice and conventions, lettering, orthographic projection, and simple working drawings. Practice is also given in tracing and blue printing. Text, French and Svensen's *Mechanical Drawing*.

101. APPLIED MECHANICS I RECITATION. Class work, fourth hour, M Tu W Th F S. Three semester credits. Prerequisites: Calculus I, and Engineering Physics II. Assistant Professor Wojtaszak.

This course includes composition, resolution and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motion; work energy and power; graphical solutions of problems in statics. Text, Poorman's *Applied Mechanics*.

105. APPLIED MECHANICS I LABORATORY. Laboratory work, fifth, sixth, and seventh hours, Tu Th. One semester credit. Must accompany or follow Applied Mechanics I Recitation. Assistant Professor Wojtaszak.

Exercises are given in the calibration and use of laboratory measuring instruments and apparatus, such as micrometers, planimeters, dynamometers, platform scales, jacks, hoists and various types of testing machines. Standard tests are also made on cement. Text: Carpenter and Diedrichs' *Experimental Engineering*. (This text is also used in the subsequent laboratory courses in applied mechanics and hydraulics, and in steam and gas engineering.)

110. APPLIED MECHANICS II RECITATION. Class work, first and second hours, M Tu W Th F. Five semester credits. Prerequisite: Applied Mechanics I. Assistant Professor Robert.

This course discusses the behavior of materials subjected to tension, compression and shear; riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of simple and continuous beams and cantilevers; bending moments and shear forces in beams; design of beams of wood, steel and reinforced concrete; design of built-up beams and box girders; resilience of beams; stresses in columns and hooks; and the design of columns of wood, steel and reinforced concrete. Texts: Boyd's *Strength of Materials* and Hool's *Reinforced Concrete Construction*, Vol. I. *Cambria Steel* is used for reference.

115. APPLIED MECHANICS E-II RECITATION. Class work, for first three-fifths of term, first and second hours, M Tu W Th F. Three semester credits. Prerequisite: Applied Mechanics I. Assistant Professor Wojtaszak.

Behavior of materials subjected to tension, compression and shear; riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of simple beams; design of beams of wood, steel and reinforced concrete; stresses in columns and hooks; and the design of columns of wood, steel and reinforced concrete. Text: Boyd's *Strength of Materials*. *Cambria Steel* is used for reference.

120. APPLIED MECHANICS II OR E-II LABORATORY. Laboratory work, fifth, sixth, and seventh hours, Tu Th. One semester credit. Must accompany or follow Applied Mechanics II or E-II Recitation. Assistant Professor Wojtaszak.

Tension, compression, shear and bending tests are made on specimens of iron, steel, wood and concrete. These include standard commercial tests and tests to determine the elastic properties of the materials. Torsion tests are also made on steel shafting. Standard tests are made on fine and coarse aggregates for concrete, and on brick.

130. HYDRAULICS RECITATION. Class work, third hour, M Tu W Th F S. Three semester credits. Must accompany or follow Applied Mechanics I. Assistant Professor Wojtaszak.

A study of fluid pressure, stresses in containing vessels and pipes, center of pressure, immersion and flotation; Bernoulli's theorem, with applications; flow through orifices, weirs, short and long pipes; loss of head due to various causes; flow of water in open channels, and its measurement; Kutter's formula; impulse and reaction of a jet; elements of water power, impulse wheels, reaction turbines and centrifugal pumps. Text: Daugherty's *Hydraulics*.

155. ENGINEERING DRAWING. Drafting, supplemented by lectures and recitations, fifth, sixth, seventh, and eighth hours, M W F. Two semester credits. Associate Professor Pearce.

Instruction is given in the selection and use of drawing instruments, construction of geometrical figures, lettering, orthographic projections, and pictorial methods of representation. Text: French's *Engineering Drawing*.

158. DESCRIPTIVE GEOMETRY. Drafting, with lectures and recitations, fifth, sixth, seventh, and eighth hours, Tu Th S. Two semester credits. Prerequisite: Engineering Drawing. Associate Professor Pearce.

In this course, which is a continuation of Engineering Drawing, more advanced problems, involving the point, line, and plane; the intersection and development of the surfaces of geometric solids; single-curved, double-curved and warped surfaces, with their sections, tangents and tangent planes; as well as the practical applications of the principles involved, are studied. Emphasis is laid on developing the student's ability to visualize drawings in the third angle.

161. MECHANICAL DRAWING I. Drafting, with lectures and recitations, fifth, sixth, seventh, and eighth hours, M W F. Two semester credits. Prerequisite: Engineering Drawing. Associate Professor Pearce.

A study is made of conventional representations, working drawings, modern drafting-room systems, and the reproduction of drawings. Additional practice is given in the inclined Gothic and Reinhardt systems of lettering. Working drawings, both detail and assembly, are made from assigned plates. Special emphasis is given to the proper selection of views to present the necessary information in convenient forms, dimensioning, checking for errors, and the subject matter and arrangement of titles and notes. Text: French's *Engineering Drawing*.

170. MECHANICAL DRAWING II. Drafting, one o'clock to 4:30, M Tu W Th F. Three semester credits. Prerequisites: Mechanical Drawing I;

Kinematics (Ap. Mech. 180) must accompany or precede this course. Associate Professor Pearce.

About one-half of the time is occupied in making free-hand sketches of simple machine parts and complete working drawings from these sketches without further reference to the objects. At least one drawing is traced, and a blue print made from the tracing. The remainder of the semester is devoted to kinematic problems, including belting, cams, linkages and gears to fulfill specified conditions. Center-line drawings are first made, embodying the solution of the problems, and upon these are built working drawings of the machine parts. An effort is made to follow standard practice in the design of those details, usually determined by empirical methods. Displacement and velocity diagrams are drawn for linkages and cams.

180. KINEMATICS. Lectures and recitations, fourth hour, daily. Three semester credits. Prerequisites, if taken for credit; Plane Trigonometry, Descriptive Geometry. Persons not taking the work for credit may be assigned to it without these prerequisites, by permission from the head of the department. Associate Professor Pearce.

An analysis of the motions and forms of the parts of machines constitutes this course. Among the subjects discussed are: bearings, screws, worm and wheel, rolling cylinders, cones, and other surfaces; belts, cord and chains, levers, cams and linkwork, with the velocity and motion diagrams; quick returns, straight-line motions, and other special forms of linkages; wheels in trains; curves for gear teeth. The solution of a large number of graphical and mathematical problems is required in this course. Text: Schwamb and Merrill's *Elements of Mechanism*.

CIVIL ENGINEERING

Professor CONRAD

102. SURVEYING I. Class work, fifth hour, M W. Field work and plotting, sixth, seventh, and eighth hours, W M. Two semester credits. Prerequisite: Plane Trigonometry. Professor Conrad.

This is a brief course in the use and care of engineers' surveying instruments. Text: Breed and Hosmer's *Surveying*, Vol. I.

111. SURVEYING II. Class work, fifth hour, Tu Th. Field work and plotting, sixth, seventh, and eighth hours, Tu Th. Two semester credits. Prerequisite: Surveying I. Professor Conrad.

The course is devoted to work in land and topographic surveying. Text: Breed and Hosmer's *Surveying*, Vol. I.

130. ELEMENTS OF IRRIGATION AND DRAINAGE RECITATION. Class work, second hour, Tu Th. One semester credit. Professor Conrad.

This course comprises a brief treatment of the subjects from the agriculturist's point of view. Texts: Elliott's *Engineering for Land Drainage*, and Fortier's *Use of Water in Irrigation*.

135. ELEMENTS OF IRRIGATION AND DRAINAGE LABORATORY. Field work, sixth, seventh, and eighth hours, Tu Th. One semester credit. Professor Conrad.

Practice work in the field and drafting room is devoted to the laying out and plotting of simple farm drainage and irrigation systems. Same text as in Civil Engineering 130.

151 and 155. SURVEYING III. Class work, first hour, M Tu W Th; field or drafting work, second, third, and fourth hours, M W. Three semester credits. Prerequisite: Surveying II. Professor Conrad.

This course comprises a study of hydrographic, city, and mine surveying. Text: Breed and Hosmer's *Surveying*, Vols. I and II.

The field exercises are devoted to practice work in topographic surveying. Time in the drafting room is devoted principally to topographic mapping. Text: Same as above.

156 and 157. SURVEYING IV. Class work, first hour, M Tu W Th; field or drafting work, second, third, and fourth hours, M W. Professor Conrad.

This course is devoted to a study of railroad curves and earthwork.

The time in laboratory is devoted to field and drafting room exercises in railroad curves and earthwork.

ELECTRICAL ENGINEERING

Professor REID

101. DIRECT-CURRENT MACHINES I. Class work, 9:30 to 10:30, Tu W Th F. Three semester credits. Prerequisites: Calculus I (Math. 113) and Engineering Physics II. Professor Reid.

The work consists of a detailed study of the fundamental principles of magnetic and electric circuits and their application to the various types of direct-current machines. Numerous problems involving the application of the principles are given as a part of the course. The class work is planned to coördinate with the work in the electrical engineering laboratory. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. I.

105. DIRECT-CURRENT MACHINES I LABORATORY. Laboratory work, fifth, sixth and seventh hours, W. One semester credit. This course should accompany or follow Direct-current Machines I. Professor Reid.

A series of experiments is outlined which is designed to necessitate careful, accurate measurement. The student is obliged to make all electrical connections with the necessary instruments in the circuit, and to record the required data. From the laboratory records a written report upon each experiment or test must be submitted. The laboratory exercises include tests for armature and field resistance, potential curves, machine characteristics, motor and generator efficiencies. Text: Swenson and Frankenfield's *Testing of Electromagnetic Machinery*, Vol. I.

170. ELECTRICAL MACHINERY AND CONSTRUCTION. Class work, fourth hour, Tu Th. Laboratory, fifth, sixth, and seventh hours, W Th, C 13. Two semester credits. Professor Reid.

This is an introductory course in applied electricity. About one-half the time is devoted to acquainting the student with the various modern methods of interior wiring, approved by the National Board of Fire Underwriters, including open, cleat wiring, knob, and tube-concealed wiring, flexible and rigid iron-pipe conduit, and metal molding. The wiring "code" is used as a reference in this part of the course, and on its completion the student should be competent to plan, lay out and install the wiring for the usual residence or business building.

The remainder of the time is devoted to the installation, care, operation, and repair of electrical machinery. It includes armature winding of direct and alternating-current motors and generators; the diagnosis and location of faults—short circuits, open circuits, grounds—and the repair of these various types of electrical-machine troubles. It also includes the installation and connection of motors, generators, meters, compensators, and other of the usual types of electrical apparatus.

FARM ENGINEERING

Associate Professor SANDERS

102. **RURAL ARCHITECTURE.** Class work, second hour, M S, R 55. Drafting-room practice, fifth, sixth, and seventh hours, M Tu Th, and first, second, and third hours, Th, R 57. Three semester credits.

This course includes lectures on the requirements, details of arrangement, and materials of construction for barns, storage, and work buildings for the farm. The preparation of specifications, bills of material, and estimates of costs is an essential part of the course. In the drafting room plans are prepared for typical farm buildings.

106. **FIELD MACHINERY RECITATION.** Class work, second hour, M S, R 55. One semester credit.

The fundamentally important definitions and principles relating to farm machinery are first given, this being followed by material concerning the development, construction, operation and use of machinery for soil preparation, seeding, cultivation, and harvesting, and of miscellaneous machinery. The importance of proper selection and care of farm machinery is emphasized.

107. **FIELD MACHINERY LABORATORY.** Laboratory, fifth, sixth, and seventh hours, W F, R 58. One semester credit.

A detailed study of the machines taken up in the classroom is conducted both in the laboratory and in the field.

116. **TRACTORS AND TRUCKS RECITATION.** Class work, third hour, Tu W Th F, R 55. Two semester credits.

This course covers the study of the construction and operation of tractors and trucks, with special reference to machines using internal combustion engines as power units.

117. **TRACTORS AND TRUCKS LABORATORY.** Laboratory, first, second, and third hours, M S, Tr. One semester credit.

A study is made of the construction of steam and gas tractors and trucks, and practice is given in the operation and testing of these machines under belt, road, and field conditions.

125. **FARM MOTORS RECITATION.** Class work, second hour, Tu W Th F, R 55. Two semester credits.

Steam engines, boilers, internal-combustion engines, and automobiles are studied descriptively, with special reference to their utilization on the farm.

126. **FARM MOTORS LABORATORY.** Laboratory, fifth, sixth, and seventh hours, W F, R 30. One semester credit.

In the laboratory are applied the principles learned in the classroom course, Farm Motors Recitation.

MANUAL TRAINING AND SHOP PRACTICE

Assistant Professor SELLERS
Assistant Professor JONES
Assistant Professor LYNCH
Instructor PARKER
Instructor GRANT
Instructor AIMAN

Instructor HANSEN
Instructor STROM
Instructor WINTER
Instructor ARMSTRONG
Assistant GRANELL

119. **MANUAL TRAINING FOR PRIMARY GRADES.** Laboratory, fifth and sixth hours, daily, S 29. Two semester credits. Mr. Parker.

The work of this course is planned to meet the need of teachers of primary work. Exercises suitable for the pupils of the various grades are made by the class and a brief study is made of suitable materials and equipment. The work includes paper folding and cutting, cardboard construction, raffia, cord work, weaving, reed work, and elementary tool work in woodworking.

120. **WOODWORKING FOR GRAMMAR GRADES.** Laboratory, first and second hours, daily, S 29. Two semester credits. Mr. Parker and Mr. Aiman.

This is a course in elementary woodworking planned primarily for the teacher of the upper grades. The work consists of simple, useful problems which bring into use the common woodworking tools. Various woods are used so as to acquaint the student with different kinds of lumber. The finishing consists of staining, filling, and waxing. Considerable emphasis is laid upon the use and care of tools.

125. **WOODWORKING I FOR HIGH SCHOOLS.** Laboratory, seventh and eighth hours, daily, S 29. Two semester credits. Mr. Parker and Mr. Aiman.

This is a continuation of grade woodwork, the work being of such a nature as to require previous experience with tools. The early part of the course consists of useful problems in elementary furniture construction, a brief study of common woods and methods of finishing them, including staining, filling, waxing, varnishing and rubbing. During the latter part of the course the various woodworking machines are discussed, demonstrated, and instructions given in using them, after which enough work is given to enable the student to operate the woodworking machines.

130. **WOODWORKING II FOR HIGH SCHOOLS.** Laboratory, third and fourth hours, daily, S 29. Two semester credits. Mr. Parker and Mr. Aiman.

This is a course in advanced cabinet construction, with the use of woodworking machinery and such bench work as is necessary for the assembling and finishing of the problems being constructed. A study is made of the progressive steps or operations in order that a proper use may be made of time. Instruction is given in the use and care of woodworking machinery and in staining, filling, varnishing, rubbing and finishing the problems constructed.

135. **WOOD TURNING.** Laboratory, third and fourth hours, daily, S 29. Two semester credits. Mr. Parker and Mr. Aiman.

This course is designed to prepare teachers for teaching wood turning in high school. The work includes typical application of tools and processes, in turning between centers, on faceplates, and by means of hollow chucks. Exercises are given in turning cylinders, cones, beads, convex and concave surface, after which articles are made from drawings which have a practical application in a student's home or social life, such as handles, mallets, rolling pins, circular boxes with covers, Indian clubs, dumb-bells, napkin rings, bowls, towel rings, typical vase forms, cups, goblets, frames, ornamental stools, etc. While many of these articles are made from blue prints, it is the aim to have the students make some object of value from his own design, both as a project in turning and as a practical lesson in designing.

141. **FARM SHOP PRACTICE.** Laboratory, fifth, sixth, seventh, and eighth hours, M Tu W Th F, S 37. Three semester credits. Assistant Professors Jones and Lynch.

This course is designed for those who wish to prepare themselves for teaching in accordance with the Smith-Hughes Act. The course consists of blacksmithing closely related to farm work, babbitting, soldering, belt lacing, thread cutting with hand dies and taps, drilling and drill grinding.

146. **FARM WOODWORK.** Laboratory, first, second, third, and fourth hours, M Tu W Th F, S 26. Three semester credits. Mr. Parker and Mr. Aiman.

This practical course is designed for the training of teachers to handle problems in connection with carpenter work on the farm. It consists of rafter cutting and erection, studding and siding work, making window and door frames, hanging doors, and similar operations on full-size construction work. Bills of material are made in all cases before each exercise is started. Exercises are given in saw filing, tool sharpening, and the general care and upkeep of tools.

150. **FORGING I.** Laboratory, first, second, and third hours, M S, S 37. One semester credit. Assistant Professor Lynch and Mr. Granell.

In this course the field of hand-forging as related to high-school work is covered. The work includes practical exercises in making articles of use, which involve the operations of drawing, upsetting, welding, twisting, splitting and shaping. Sufficient instruction is given in the forging of tool steel to enable the worker to forge, harden and temper many of the tools which are needed in this and other branches of manual training.

Tools required: One pair five-inch outside calipers, one two-foot rule, one ball-peen hammer, weight about two pounds, including handle.

155. **FORGING II.** Laboratory, first, second, and third hours. M S, S 37. One semester credit. Assistant Professor Lynch and Mr. Granell.

Advance work is given in the forging of iron and in the manufacture of tools, such as punches, chisels, drills, scrapers and hammers. Instruction is given in the proper methods of heating, forging, hardening, tempering, annealing and working the various kinds of tool steel and in the casehardening of mild steel.

Tools required: Same as in Forging I.

160. **FOUNDRY PRACTICE.** Laboratory, first, second, and third hours, M S, S 40. One semester credit. Mr. Grant.

Practice is given in floor, bench, and machine molding, in core making, and in casting, in iron, copper, brass, and special alloys. A study is also made of modern foundry construction, equipment, materials, and methods.

170. **MACHINE TOOL WORK I.** Laboratory, fifth, sixth, and seventh hours, Tu W Th F, S 32. Two semester credits. Assistant Professors Sellers and Jones.

This course includes both bench and machine tool work, in which practice is given in chipping, filing, shaper and planer work, scraping, drilling, cutting, right- and left-hand and multiple threads, and knurling on the lathe. Practically all of the work is upon parts of machines that are being built in the shops.

Tools required: A four-inch scale, or B. & S. slide caliper rule, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, one B. & S. center gauge.

192. **MACHINE TOOL WORK II.** Laboratory, fifth, sixth, and seventh hours, Tu Th, S 32. One semester credit. Assistant Professors Sellers and Jones.

This course consists of progressive problems in turning and caliper-ing, boring, reaming and taper turning and threading on the lathe, exercises in chucking, the use of forming tools, practice on the key-seating machine, and the making of a spur gear on the milling machine.

Tools required: Same as in Machine Tool Work I.

193. **MACHINE TOOL WORK III.** Laboratory, fifth, sixth, and seventh hours, W F, S 32. One semester credit. Assistant Professors Sellers and Jones.

This course takes up work on the turret lathe and boring mill; lacings, and methods of belt connections, compound and differential indexing, and the cutting of spiral gears on the milling machine.

Tools required: Same as in Machine Tool Work I.

SHORT COURSES RELATED TO ENGINEERING

Automobile Operation
Automobile Repair
Tractor Operation
Carpentry

Machine Shop Work
Foundry Practice
Blacksmithing

The following short courses are intended for those who have not the time or the means to take any of the regular engineering courses in the College, but who wish to obtain a practical working knowledge of one of the trades related to engineering.

Students can enroll in any of these courses on the first Monday of any month from September to June. Instruction is suspended during the month of August. The course in automobile operation and tractor operation each require eight weeks. Automobile repair, carpentry, machine shop, foundry, and blacksmithing courses require twelve weeks or more, depending on the previous training and experience of the individual.

There is no charge for tuition, but an incidental fee of \$5 for the eight-weeks courses, or \$10 for the longer courses, not exceeding eighteen weeks in length, is charged at entrance. A sick-benefit fee of \$1 for the eight-weeks courses, or \$1.50 for the longer courses, is also charged, and entitles the student to free medical attention from the College physician. Laboratory charges to cover the cost of the materials used are made in accordance with the following schedule: Automobile operation, automobile repair, tractor operation, blacksmithing, and machine shop, \$18 for each four weeks; carpentry and foundry courses, \$9 for each four weeks.

The College reserves the right to revise its schedule of fees at any time without notice.

AUTOMOBILE OPERATION. This course, covering a period of eight weeks, is adapted to those who wish to learn how to operate and repair their own automobiles. Two weeks of the course is spent in studying the lighting, ignition, starting, and generating systems used on the various cars, and the proper method of caring for them. Three weeks is spent in the automobile laboratory working with the electrical and fuel systems used on the Ford, Dodge, Cadillac, Buick, and other popular cars. One week is given to soldering and babbiting, and two weeks to such work as grinding valves, fitting bearings, cleaning out carbon, fitting rings, lapping in pistons, adjusting ring and pinion gears, fitting gaskets, relining brakes, tube repairing, and other work of particular value to the automobile owner.

AUTOMOBILE REPAIR. This course is designed for those who expect to enter commercial shops and work as garage mechanics. Two weeks are spent studying the electrical equipment of the automobile, including the construction and operation of batteries, magnetos, coils, ignition, lighting, starting, and generating systems, cut-out relays, regulators, circuit breakers, ammeters, and switches; three weeks in the automobile laboratory working with the more popular cars on the ignition, starting, lighting, and generating systems, and on wiring, carburetion, and troubleshooting exercises; one week in soldering and babbiting; one week in studying the construction of the various parts of the chassis, including frames, springs, axles, bearings, steering gears, tires; five weeks in the automobile repair laboratory fitting bearings, pistons, rings, adjusting gears, timing valves and ignition, grinding valves, overhauling generators, motors, distributors, testing coils, ammeters, and the like.

TRACTOR OPERATION. The tractor course covers thoroughly the construction, operation, and adjustment of all kinds of tractors and their equipment; stationary gas engines; power farm machinery, including tractor hitches; shop work.

About twenty tractors and twenty-five stationary gas engines are available for the laboratory work in this course, besides great numbers of smaller items of equipment in the way of magnetos, carburetors, and other attachments.

CARPENTRY. A practical study is made of general carpenter work, including the use of carpenters' tools, reading of drawings and blue prints, hand work and machine work, framing, building construction, and form building for concrete.

MACHINE SHOP WORK. The course in machine tool work is designed to meet the demands of those who must prepare themselves in a short time for this line of work. The work is suited to the needs of the individual student. The entire machine shop of the College is available for this course, which includes a thorough training in the manipulation of lathes, planers, drill presses, boring mills, shapers, and screw machines.

In order to enable the students to become familiar with both tools and shop processes, the construction of standard gasoline engines and wood lathes is followed from the machining of the rough castings to the assembly of finished parts. Students may in this way make their own engines and lathes.

FOUNDRY PRACTICE. This course is intended to train practical molders, and includes bench molding with a great variety of patterns, experience with different kinds of sands and facings; open sand work, sweep molding, machine molding, core making; setting of cores, gates and risers; different methods of venting; also general foundry practice.

FOUNDRY PRACTICE. Laboratory, first to seventh hours, inclusive, M Tu W Th F, and first to fourth hours inclusive, S, S 40. Mr. Grant.

This course is intended to train practical molders, and includes bench molding with a great variety of patterns, experience with different kinds of sands and facings; open sand work, sweep molding, machine molding, core making; setting of cores, gates and risers; different methods of venting; also general foundry practice.

BLACKSMITHING. Laboratory, first to seventh hours, inclusive, M Tu W Th F and first to fourth hours, inclusive, S, S 37. Assistant Professor Lynch and Mr. Granell.

A practical course is given in forging operations, such as drawing, welding, bending, twisting, punching, care of forge fire; the making of various tools, such as punches, chisels, drills, scrapers, hammers; hardening, tempering, annealing, case and pack hardening, tool forging, oxyacetylene and thermit processes of welding.

A student entering any branch will devote his entire attention to the work in which he is most interested or for which he is best prepared. He will be given practical instruction by efficient teachers, completely mastering each step before proceeding to the next. He will work with the machines themselves, studying the construction, operation and adjustment of every part until he thoroughly understands it. The courses are so arranged that the student will have much individual attention from the instructor, though the development of initiative will not be neglected.

Division of Home Economics

HELEN B. THOMPSON, Dean

APPLIED ARTS

Professor HOLMAN

101. DESIGN. Class work, first hour, M W F, A 67; studio work, second, third, and fourth hours, A 67. Three semester credits. Professor Holman.

A study is made of the principles which control the use of color and the selection and arrangement of elements in the production of objects themselves and in their uses as parts of a whole. Many exercises are given in which clothing and home furnishings are scored as to design. A natural motif is adapted to material, function, and form.

102. PUBLIC SCHOOL DRAWING. Class work, fifth hour, Tu Th, A 67; studio work, sixth, seventh, and eighth hours. Two semester credits. Professor Holman.

This course presents representation, color, design, construction work, and picture study for rural and grade schools.

CLOTHING AND TEXTILES

Professor GLANTON
Instructor FECHT

101. CLOTHING I. Class work and laboratory, Tu W Th F, third and fourth hours. Two semester credits. Miss Fecht.

It is the purpose of this course to train the student in the handling of sewing equipment and in efficient, intelligent methods of work. Attention is given to the selection of design and the adaptation of commercial patterns to individual needs. The kinds, qualities and quantities of materials suitable for making different garments are discussed.

Laboratory.—The construction of simple garments; millinery, remodeling, renovating and repairing of garments are the principal projects studied. Labor-saving methods and rapid construction are emphasized. Home studies in construction are required.

103. PUBLIC-SCHOOL SEWING. Class work, first hour, W. Laboratory, second, third, and fourth hours, W. One semester credit. Professor Glanton.

This course is especially recommended for those who teach in rural schools and would like to teach sewing and the elementary principles of the selection of textile fabrics for personal and household use. A study is made of the needs of a teacher in a one-room rural school as well as those in larger schools, the equipment necessary, and the series of projects suitable for working out the problems presented.

Laboratory.—Simple home tests for the determination of the value of various fabrics are given, and an intelligent basis is sought for the selection of materials. Articles are constructed suitable in size and graded on difficulties of technic. Group work is considered.

111. CLOTHING II. Class work, first hour, Tu Th. Laboratory second, third, and fourth hours, Tu Th. Two semester credits. Professor Glanton.

This course considers the manufacture and selection of clothing; clothing industries and clothing standards in their relation to the economic and social life of the community; comparison of home-made and

factory-made garments; hygienic factors involved in clothing; standardization of dress, its advantages and disadvantages; clothing budgets for individual and family groups.

Laboratory.—The laboratory consists of group work in making entire outfits of clothing for individuals of different ages or the planning and making of the garments required in the wardrobe of a family.

116. TEXTILES. Class work, first hour, M Tu Th F. Laboratory second, third, and fourth hours, M S. Three semester credits. Prerequisite: Organic Chemistry. Miss Fecht.

This course considers the historical and economic development of the textile industry from primitive ages to the present time. The combination of art, science, and mechanics that make possible the intrinsic and esthetic values of modern textiles, is given careful attention. The principal aim of the course is the development of judgment in the selection of textiles.

Laboratory.—The behavior of textile fibers toward various chemical reagents is studied. Physical, chemical, and microscopic tests are made for the identification of fibers. Laundry processes are studied for the effects on color, shrinkage, and wearing qualities of garments. Consideration is given to the value of mixed goods and shoddy, as well as artificial silks.

FOOD ECONOMICS AND NUTRITION

Associate Professor ROTHERMEL
Fellow KIRKPATRICK

101. FOODS I. Class work, fourth hour, Tu Th, L 27; laboratory, first, second and third hours, Tu W Th F, L 22. Three semester credits. Prerequisite: Entrance credit in physics. Miss Kirkpatrick.

The application of heat to various principles is the basis of study in this course. The economic uses of the various foodstuffs is emphasized, as is also the study of commercially prepared food products.

Laboratory.—Experimental and practical cookery, illustrating this course, forms the basis of the laboratory work.

201. DIETETICS. Class work, first hour, M Tu W Th F, L 27; laboratory, second, third, and fourth hours, Tu W Th F (six weeks); dietetics practice work, seventh, eighth, and ninth hours, Tu W Th F, L 45 (three weeks). Five semester credits. Prerequisite: Human Nutrition. Associate Professor Rothermel.

This course deals with the application of the principles of human nutrition to the practical feeding problems of the individual and the group. The following topics receive attention: daily food requirements in health and in disease throughout infancy, childhood, adolescence, adult life, and old age: typical dietaries for each period of life; milk formulæ; the problem of satisfying the diverse requirements in families and other groups.

Laboratory.—Studies in weight, measures, and cost of some of the common food materials; calculations and quantitative preparation of standard portions and combinations of foods; analyses of recipes; computation and scoring of dietaries with special regard to nutritive requirements for varying physiologic, economic, and social conditions; practice in marketing and serving, comprises the work in the laboratory. (Graduate students are required to do an assigned problem in place of the practice in marketing and serving included in the laboratory for undergraduates.)

HOUSEHOLD ECONOMICS

Assistant Professor BALDWIN
Assistant Professor LEAZENBY

116. PRACTICE COURSE IN HOUSEHOLD MANAGEMENT (Practice House). By appointment. Three semester credits. Prerequisite: Foods II. Recommended to precede or parallel: Household Management. Assistant Professor Baldwin.

This course is conducted in the practice house. The students live in a group and perform the usual household tasks, including marketing, planning, cooking and serving meals, caring for the rooms, planning the household budget, and keeping the accounts. Students who wish to qualify as teachers under the Smith-Hughes requirements for vocational high schools are required to take this course.

209. HYGIENE AND HOME NURSING. Class work, second hour, M Tu W Th F S, L 40. Three semester credits. Prerequisites: Human Physiology, and Household Microbiology. Assistant Professor Leazenby.

This course puts special emphasis on the prevention of disease and on the building up of the highest degree of health as the principal functions of the home nurse. The topics studied include the prevention and treatment of functional disturbances, the methods of controlling and nursing communicable diseases, the application of dietic and serum therapy, the treatment of injuries and wounds, and the practical care of the sick. There are lectures, discussions, and demonstrations, and reference work and special reports are required.

221. INSTITUTIONAL MANAGEMENT I. Class work, sixth hour, Tu Th, L 40. Laboratory, 7 o'clock to 11, M W F, K 30. Three semester credits. Prerequisite: Human Nutrition. Assistant Professor Baldwin.

This course deals with the food problem of institutions and includes the study of marketing, preparation of food, arrangement of menus, and cost of service for different types of institutions.

Laboratory.—Practical experience in the cafeteria of the department and investigations of the food problems of other institutions are included in the laboratory work.

Division of Rehabilitation

ED. L. LITTLETON, Local Supervisor.

FEDERAL BOARD FOR VOCATIONAL EDUCATION

Special Instructor GUILBERT
Special Instructor CLUTE

It is the object of the Federal Board to make each man's training as continuous as possible. With this in mind each student of the Board is expected to stay for the Summer School. It is the opinion of the Board that there are few students who cannot find some work that will directly apply on their regular course.

Placement Training will be arranged for those who cannot be accommodated. This applies, more particularly, to juniors and seniors in the Divisions of Engineering and Veterinary Medicine.

The men of non-collegiate rank in the various Trade Courses and the School of Agriculture will be especially well cared for in their respective courses. An opportunity for the study of common-school subjects, such as Arithmetic, English Grammar, and Civics, will be given to those who want and need this work.

Special courses for Federal Board students only will be offered in dairying, poultry husbandry, and General Agriculture, and in any other

subject for which there is a demand. These will be very practical in nature, the laboratory phase of the work being strongly emphasized. Transportation will be provided for field laboratory work in connection with the above course. This will consist largely of a study of methods and projects being carried on on the College farm and other farms and ranches in the vicinity of Manhattan. The summer months being the growing season, this is without doubt the best time of the year for the study of crops and methods of farming.

The above courses should especially appeal to the disabled man whose education does not permit him to carry collegiate work and whose disability will not allow him to do heavy farm work, but who can successfully "carry on" in the lighter phases of agriculture, possibly dairying, poultry raising, bee culture, floriculture, etc.

Division of General Science

J. T. WILLARD, Dean

BACTERIOLOGY

Professor BUSHNELL
Assistant BAKER

101. GENERAL MICROBIOLOGY. Class work, second hour, M S, V 59. Laboratory, fifth and sixth hours, M Tu W Th F S, V 51. Three semester credits. The course is designed primarily for teachers, but students in General Science and in Agriculture may obtain credit in this course by special arrangement with the head of the department.

This course consists of a general survey of the subject of bacteriology as related to agriculture, sanitation, the preparation and care of food, etc. Some attention is also given to the method of isolation, cultivation and study of microorganisms. The student becomes somewhat familiar with the methods used in the bacteriological analysis of water, milk, etc.; sterilization, sources and modes of infection by pathogenic bacteria, and means of controlling their distribution.

121. HOUSEHOLD MICROBIOLOGY. Class work, third hour, M Tu W Th F S, V 59. Laboratory, fifth and sixth hours, M Tu W Th F S, V 51. Five semester credits.

This course is especially arranged for students taking domestic science. The credit received in this course is equivalent to that given for the regular college course. Students wishing to take this course should consult the head of the department before entering. See general catalogue for description of work offered, course 121.

301. RESEARCH BACTERIOLOGY. Class work, first hour, by appointment. Elective. Credit to be arranged. Prerequisite: The student must have credit in at least two of the outlined courses offered by the department.

Advanced students showing sufficient training, ability, and interest in original research may be admitted to this course, upon approval of the head of the department. The student will be under the direct supervision of a faculty member of the department, and in consultation with him the subject for investigation will be chosen and outlined.

BOTANY

Assistant Professor HAYMAKER
Assistant CASHEN

101. GENERAL BOTANY I. Class work, fifth and sixth hours, M Tu W Th F. Three semester credits. Prerequisite: High-school Botany. Miss Cashen.

This is a course of lectures, combined with special study of a required text, with reference reading. The principal life functions of plants, responses of plants, such as photosynthesis, digestion, respiration, transpiration and growth, and the responses of plants to environmental conditions and physical stimuli, are studied. The anatomy of the plant, in so far as it relates to the functions concerned, will be studied in some detail. In this course the student gains a general introductory knowledge of the functions and reactions of plants, and learns to regard them from the dynamic standpoint, as working organisms. Text: *A Text Book of Botany for Colleges*, by Ganong.

Laboratory.—A series of typical experiments is followed out in the laboratory and in the greenhouse. Each student is furnished with a set of the necessary apparatus, and learns to apply quantitative methods to the study of functions. Laboratory outlines are furnished by the department.

105. GENERAL BOTANY II. Class work, seventh and eighth hours, M Tu W Th F. Three semester credits. Prerequisite: General Botany I. Miss Cashen.

A careful study is made of the morphology of the chief great groups of plants, of their physiology and ecology, of the classification and geographic distribution of the plant kingdom, and its economic relation to man. The latter part of the course is devoted to a systematic study of some of the more important plant families in which their floral structures are considered. Some time is given to the tracing out of unknown plants by means of a key.

Laboratory.—The aim of the laboratory in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity, and of their probable relations to one another as parts of an evolutionary series. Laboratory outlines are furnished by the department. Text: *A Text Book of Botany for Colleges*, by Ganong.

116. ECONOMIC PLANT DISEASES (PLANT PATHOLOGY I). Class work, third and fourth hours, M Tu W Th F. Field, laboratory and library work, twelve hours. By appointment. Three semester credits. Prerequisite: General Botany II. Assistant Professor Haymaker.

The diseases affecting the chief economic crops of the field, orchard and garden are studied. Among these are the smuts of cereal and forage crops; the common rusts attacking wheat, oats, rye and barley; the apple blotch, apple scab, Illinois blister canker, brown rot of fruits; potato, tomato and bean diseases, together with many others. Methods for preventing losses brought about by plant diseases will receive considerable attention. This course is intended to make high-school teachers familiar with the common plant diseases which are causing a great annual loss in Kansas. Time will be devoted to collecting and identifying these diseases in the field. Methods of collecting, preserving and preparing plant diseases for exhibit purposes, especially for high-school work, will receive some attention. Laboratory outlines furnished by the department.

153. ECONOMIC BOTANY. By appointment. Class work, two hours; field, laboratory and library work, twelve hours. Three semester credits. Assistant Professor Haymaker.

This course is designed especially for teachers interested in agricultural work, for those engaged in Smith-Hughes work, and for those who desire a practical course which will be helpful in preparing them for work as agricultural agents. Field trips will be taken for the purpose of collecting and identifying plants of economic importance. In this connection, the student will learn how to identify flowers, weeds, etc., by the use of a key. Plant diseases will be collected in the field, and will be studied rather critically in the laboratory. Methods of plant disease control will be studied, seed treatments demonstrated, etc. The lecture work will supplement the laboratory work. The exact outline of the course will not be perfected until the needs of the members of the class are determined.

155. FIELD BOTANY. By appointment. Class work, two hours; field, laboratory and library work, twelve hours. Three semester credits. Assistant Professor Haymaker.

The purpose of the course is to offer teachers an opportunity to become acquainted with plants in the field, their natural history, habits, distribution and relation to their environment. Excursions will be made to different localities near Manhattan, to study plants of the prairies, woods, swamps, streams, etc. Especial attention will be given to methods of collecting and preserving plants for use in high-school teaching. Part of the laboratory work will consist of determining the names of plants by means of manuals. Text: Gray's *New Manual of Botany*.

CHEMISTRY

Professor KING
Professor SWANSON
Professor HUGHES
Associate Professor BRUBAKER

Associate Professor COLVER
Associate DE ROSE
Instructor WEST
Instructor HARRISS

101. CHEMISTRY I. Class work, first hour, M Tu W Th F S, C 26. Laboratory, fifth, sixth, seventh, and eighth hours, M W F, W 31. Five semester credits. Prerequisite: High-school Physics. Mr. West, Miss Harriss.

This work begins the study of general chemistry, and is designed, with that of the succeeding semesters, to give the student a knowledge of the fundamental principles of chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions, the principles of nomenclature, the significance of formulas, chemical equations, etc., much attention is given to these, while at the same time the practical uses of the substances, and the processes used in metallurgy, engineering, agriculture, and other arts are emphasized. McPherson and Henderson's *A Course in General Chemistry* is used as a textbook, this semester's work covering the first 331 pages. The text is supplemented by lectures and is amply illustrated by experimental demonstrations.

Laboratory.—As far as time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required, as far as possible, to study experiments in that light. In this, as in all other laboratory work in chemistry, the objects are to illustrate chemical phenomena, and to teach care in manipulation, attentive observation, logical deduction, and discrimination and accuracy in recording results and conclusions. The student is required to give the designated amount of time, and a minimum amount of work must be satisfactorily performed in order to obtain credit. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

102. CHEMISTRY II. Class work, third hour, M Tu W Th F S, C 26. Laboratory, fifth, sixth, seventh, and eighth hours, M W F, W 31. Five

semester credits. Prerequisite: Chemistry I. Mr. West, Miss Harriss.

The first half of this course is a completion of the study of general chemistry begun in the preceding course. The second half of the course is devoted to the study of the general principles of qualitative analysis as outlined in an *Elementary Treatise on Qualitative Analysis*, by William McPherson.

Laboratory.—In the laboratory the student studies the ordinary methods of separation and detection of the more common metals, non-metals, acids, bases, and salts. The teaching of analysis as such is a secondary object, although the student is held to the exact observation and careful reasoning required in ascertaining the composition of single substances and mixtures. The effect of the course is to broaden, strengthen, and unify the students' ideas of general chemistry.

120. ORGANIC CHEMISTRY (Agr.). Class work, first hour, M Tu W Th F S, C 27. Laboratory, second, third, and fourth hours, Tu Th, C 54. Three semester credits. Prerequisite: Chemistry II. Associate Professors Brubaker and Colver, and Mr. West.

This course is given for students in the Division of Agriculture and includes a careful study of the aliphatic series of hydrocarbons, alcohols, ethers, aldehydes, ketones, organic acids, esters, fats, waxes, carbohydrates and proteins. Attention is directed to the characteristic properties and relationships of these various classes of compounds and typical members of each group are studied particularly from the standpoint of structure, laboratory preparation and chemical properties as shown by their reactions. Text: Norris, *Organic Chemistry*, in part, accompanied by lectures.

Laboratory.—The laboratory work is arranged to parallel the study in the classroom and includes the preparation of a limited number of organic compounds and a study of their properties and reactions. The experiments include work with fats, carbohydrates, and proteins. The laboratory directions which are used have been prepared and are supplied by the department.

121. ORGANIC CHEMISTRY (HE). Class work, second hour, M Tu W Th F S, C 27. Laboratory, fifth, sixth, seventh, and eighth hours, Tu Th S, C 54. Five semester credits. Prerequisite: Chemistry II. Associate Professor Brubaker and Mr. West.

This course is for students in the Division of Home Economics and is outlined to give a firm foundation for advanced work in foods and nutrition. A systematic study is made of the more important classes of organic compounds, particularly the aliphatic hydrocarbons, alcohols, ethers, aldehydes, ketones, organic acids, fats, soaps, sugars, starch, and proteins. In addition to a study of aliphatic compounds a brief consideration is also given to several series of aromatic compounds. Especial attention is given to those organic compounds which are used for clothing, fuel, light, antiseptics, disinfectants, anæsthetics, medicine, solvents, in the commercial manufacture of other important products, as well as to many other compounds which contribute to a fuller understanding of the systematic relations existing among all organic compounds. Text: Norris, *Organic Chemistry*, in part, accompanied by lectures.

Laboratory.—In the laboratory the student prepares one or more representative examples of most of the classes of compounds taken up in the classroom. A study is made of their physical properties and their chemical properties as shown by typical relations. The experiments include work with fats, carbohydrates, and proteins. The laboratory directions which are used have been prepared and are supplied by the department.

150. QUANTITATIVE ANALYSIS I. Laboratory, fifth, sixth, seventh and eighth hours, M W F, C 4. Two semester credits. Prerequisites: Chemistry I and II. Associate Professor Brubaker.

This course is planned to give the student a knowledge of the simpler operations in gravimetric analysis and volumetric analysis and to lay the foundation for studies in which such knowledge is required. Particular emphasis is laid on the importance of exact quantitative work and its value in investigations connected with agriculture. Textbook: *Notes on Quantitative Chemical Analysis*, by C. W. Folk.

206. PHYSICAL CHEMISTRY. Lectures and recitations, six hours; laboratory, twelve hours. By appointment. Five semester credits. Prerequisite: Chemistry II or Chemistry HE-II. Professor King.

This course is especially adapted to meet the needs of students intending to specialize in soils, as well as those students in other divisions who desire a broader knowledge of the more fundamental laws of chemistry. In this course emphasis is placed upon the study of gas laws, osmotic pressure, surface tension, solution, colloidal solutions, thermochemistry, equilibria, and electrical conductors.

Laboratory.—In the laboratory the subject matter discussed in the lectures is investigated experimentally.

218. ORGANIC CHEMISTRY I. Class work, third hour, Tu W Th F, C 27. Laboratory, fifth, sixth, seventh, and eighth hours, M W F, C 54. Four semester credits. Prerequisite: Chemistry II. Associate Professor Colver.

This course is for those students who expect to take a second semester of organic chemistry. The aliphatic hydrocarbons, alcohols, ethers, aldehydes, ketones, acids, esters, amides, acylhalides, anhydrides, amines, amino-, hydroxy-, and halogen acids, aldehydes, and ketonesacids, hydroxy aldehydes, hydroxy ketones, and related compounds are considered particularly from the standpoint of structure, methods of laboratory and commercial preparation, reactions, and uses. References: Perkin and Kipping, *Organic Chemistry*.

Laboratory.—The laboratory work parallels the lectures and includes the preparation, purification and reactions of one or more typical examples of most of the groups of compounds studied in the classroom. The laboratory directions which are used have been prepared and are supplied by the department.

219. ORGANIC CHEMISTRY II. Class work, second hour, Tu W Th F, C 26. Laboratory, fifth, sixth, seventh, and eighth hours, M W F, C 54. Four semester credits. Prerequisite: Organic Chemistry I. Associate Professor Colver.

This course is a continuation of Organic Chemistry I and takes up in analogous manner the structure, methods of laboratory and commercial preparation, reactions and uses of the aromatic compounds. Particular attention is also given to the orientating influence of various groups, the structure and reactions of the diazonium compounds and a brief study is made of the different classes of dyes, the alkaloids, the terpenes, and a few heterocyclic compounds.

Laboratory.—In the laboratory the student carries out various preparations that illustrate the reactions which are characteristic of aromatic compounds such as bromination, sulfonation, nitration, acetylation, diazotization, and replacement and coupling of the diazonium group. A portion of the laboratory work includes the determination of carbon, hydrogen, and nitrogen in pure unknown organic compounds by the combustion method. Laboratory guide: Noyes, *Organic Chemistry for the Laboratory*.

223. ORGANIC PREPARATIONS. This class meets in the afternoon fifth to ninth hours, the amount of time required being six hours for each hour of credit sought. One to five semester credits. Prerequisite: Organic Chemistry II. Associate Professor Colver.

The compounds prepared in this course are so chosen as to give the student a thorough knowledge of the fundamental principles of synthetic organic chemistry.

234. BIOCHEMICAL PREPARATIONS. Laboratory, fifth, sixth, seventh, eighth, and ninth hours, daily. Five semester credits. Prerequisite: Organic Chemistry II and Physiological Chemistry I. Professor Hughes and Mr. West.

This course includes the isolation, purification, and analysis of a number of compounds which are of importance in biochemistry and nutrition.

241. QUANTITATIVE ANALYSIS. Class work, first hour, Tu Th, C 4. Laboratory, fifth, sixth, seventh, eighth and ninth hours, daily, C 4. Five semester credits. Prerequisite: Chemistry II, or its equivalent. Associate Professor Brubaker.

This course is designed for those students who have elected to follow one of the three courses in chemistry. The subject matter considered is practically the same as that given in courses 250 and 251. Text: Makin, *Quantitative Analysis*.

256. CHEMICAL RESEARCH. Excellent opportunities are offered students to undertake research work in chemistry. Such work is constantly being conducted in the laboratories of the department in connection with the Agricultural and Engineering Experiment Stations. The state food laboratory and the laboratories for analysis of feeds and fertilizers are also accessible to students desiring research along such lines. Much emphasis is placed upon research in the department, and all students whose training is adequate are encouraged to participate. Work is offered in the following lines:

Agricultural Chemistry. Professor Swanson.

Applied Analytical Chemistry. Associate Professor Brubaker, and Assistant Professor Latshaw.

Applied Organic Chemistry. Associate Professor Colver.

Biochemistry. Professor Hughes.

Applied, General, and Physical Chemistry. Professor King.

257. FOOD ANALYSIS. Laboratory work, by appointment, eighteen hours. Three semester credits. Prerequisites: Organic Chemistry, and Quantitative Analysis I. Associate Food Analyst De Rose.

This course includes the quantitative methods employed in the analysis of the various kinds of foodstuffs. It also includes practice in testing for the presence of adulterants, preservatives, and coloring materials.

ECONOMICS AND SOCIOLOGY

Professor KAMMEYER

101. ECONOMICS. Class work, first hour, M Tu Th F S, A 51. Three semester credits.

This course aims to present the fundamentals of man's wealth-getting and wealth-using activities. It includes a study of value, demand and supply, markets and prices, money and its purchasing power, credit and banking, forms of business organization, rent, wages, interest, and profits; and the laws both natural and statutory which control, modify, or limit these activities.

Turner's *Introduction to Economics* is used as a text. This is supplemented by assigned library readings, note books, reports, lectures and class discussions.

151. SOCIOLOGY. Class work, second hour, M Tu W Th F S, A 51. Three semester credits.

This course deals with social life in general, involving a study of social origins, activities, and organizations. Such social institutions as the family, the church, the state and the school are studied as to origin, development, organization, and aims. The processes of socialization, social forces, and social control are studied. Consideration is given also to social pathology; poverty, its causes and remedies; crime, its causes and prevention; and to remedial legislation and corrective agencies. The aim of the course is to help the student get his social bearings, and to find himself as fact and factor in the complex interrelations of human society. Hayes's *Introduction to Sociology* is used as a text. This is supplemented by library readings, note books, lectures and class discussions.

225. CURRENT ECONOMIC PROBLEMS. Class work, fourth hour, Tu W Th F, A 51. Two semester credits.

The subject matter of this course is left largely to the election of those who take it. Any problem or problems of an economic character which are of special interest or prominence for the time being may be selected for special study. At present the problems of economic insecurity, of international trade, of trade unionism, and of taxation invite general interest and attention. These or others not herein mentioned will be made the subject of careful study, classroom discussion, and written reports. Materials are gathered from library references, newspapers, magazines and government reports. Especial effort is made to encourage and direct students to think independently and logically, and to formulate their own judgments. This course should be preceded by course 101.

EDUCATION

Professor HOLTON
Professor ANDREWS
Professor PETERSON
Professor WILLIAMS

Professor STRICKLAND
Professor BURR
Associate Professor EDWARDS
Assistant Professor DAVIDSON

101. PSYCHOLOGY I. Class work, first hour, M Tu W Th F S. Three semester credits. Required for three-year state certificate. Professor Peterson.

This is an introductory course in psychology for teachers. It consists primarily in a study of the nature of the learning process and of the conditions and methods of study which favor the most rapid and effective progress in learning. The distribution and significance of individual differences and other related topics will also receive attention.

104. PSYCHOLOGY IV. Class work, third hour, M Tu W Th F S. Professor Peterson.

This course is essentially similar to course 103, but more attention is given to those phases of individual and applied psychology which bear directly on the practical problems of daily life. Students in agriculture, engineering, and industrial journalism who desire some work in psychology should enroll in this section.

105. EDUCATIONAL ADMINISTRATION I. Class work, second hour, M Tu W Th F S. Three semester credits. Required for state teachers' certificate. Professor Andrews.

This course is a study of the organization of state, city and county school systems, with special emphasis upon rural and vocational schools; the interrelation of the functions of boards of education, superintendents, principals, teachers. Study of the school law of Kansas is an important part of the course.

106. EDUCATIONAL ADMINISTRATION II. Class work, fourth hour, M Tu W Th F S. Three semester credits. Professor Williams.

This course is similar to 105 in the general principles of educational administration in a democracy, but differs from it in that it gives special

emphasis to the administration and supervision of vocational agriculture, homemaking, and trades and industry. Students preparing to teach these subjects should take this course rather than 105.

113. HISTORY OF EDUCATION I. Class work, sixth hour, M Tu W Th F S. Three semester credits. Professor Andrews.

This course is intended to present the successive relationships that have existed between educational machinery and practices, and the changing political, economic, scientific, cultural and ideal environments from primitive times to the present.

118. EDUCATIONAL SOCIOLOGY I. Class work, first hour, M Tu W Th F S. Three semester credits. Professor Holton.

This course deals with the concrete objectives of education considered as a process of social adjustment; the meaning of education in a democracy; the educative functions of the home, the community, the church and the school; the school as a special environment; the meaning of labor and leisure; cultural and vocational education; intellectual and practical studies; and physical and social studies.

119. EDUCATIONAL SOCIOLOGY II. Class work, second hour, M Tu W Th F S. Three semester credits. Professor Holton.

This course is similar to 118 in general principles of education in a democracy, but differs from it in that it deals with the concrete objectives in vocational agriculture, homemaking, and trades and industry. Students preparing to teach these subjects should take this course rather than 118.

121. HOME ECONOMICS EDUCATION. Class work, third hour, M Tu W Th F S. Two semester credits. Required of all candidates for state teachers' certificates who are preparing to teach home economics. Prerequisites: Foods I and II, Clothing I and II. Associate Professor Edwards.

This course considers problems dealing with the place of home economics in modern secondary education; the aims and the organization of the work in various types of schools; the administration, maintenance, equipment and supervision of departments of home economics. Special attention is paid to Kansas conditions.

125. AGRICULTURAL EDUCATION. Class work, third hour, M Tu W Th F S. Two semester credits. Required of all candidates for state teachers' certificates who are preparing to teach agriculture. Prerequisite: Educational Administration. Professor Williams or Assistant Professor Davidson.

A comparative study is made of the provisions for agricultural education in Kansas and other states and countries and of the principles underlying such education. The part played in agricultural education by community, county, state and nation is discussed. Types of schools, courses of study, adjustment of school work to community needs, and the equipment and administration of agricultural schools are studied. The aim of the course is to fit the student to plan, teach and administer or supervise agricultural work, especially in high schools.

129. INDUSTRIAL EDUCATION. Class work, second hour, M Tu W Th F S. Two semester credits. Expected of all candidates for state teachers' certificates who are preparing to teach manual training, shop work, trade courses and other industrial subjects. Prerequisite: Educational Administration. Professor Williams.

This course is a study of typical secondary schools of industrial education and departments of industrial education in public schools; of the industrial schools of Germany and other foreign systems; of the making of a course of study in industrial education for secondary schools; and of shop equipment and costs.

132. SPECIAL METHODS IN THE TEACHING OF HOME ECONOMICS. Class work, fourth hour, M Tu W Th F S. Three semester credits. Expected of all candidates for state teachers' certificates who are preparing to teach home economics. Prerequisites: Foods I and II, Clothing I and II, and Psychology. Associate Professor Edwards.

This course applies the principles of sound teaching to the selection and development of the subject matter of home economics in lessons for high-school pupils and to the conduct of laboratory and classroom exercises. It is supposed to accompany course 141.

136. SPECIAL METHODS IN THE TEACHING OF AGRICULTURE. Class work, second hour, M Tu W Th F S. Three semester credits. Required of all candidates for state certificates who are preparing to teach agriculture. Prerequisite: Psychology. Professor Williams or Assistant Professor Davidson.

Training in planning lessons, organizing materials, and conducting class and laboratory work in agriculture is the purpose of this course. The work includes observation, criticism and reports of class exercises, a study of work done in high schools, and the making and criticism of lesson plans and outlines. Special attention is given to the selection of laboratory materials, the supervision of laboratory exercises, and the adaptation of class and laboratory work to each other.

140. SPECIAL METHODS IN THE TEACHING OF INDUSTRIAL SUBJECTS. Class work, third hour, M Tu W Th F S. Three semester credits. Expected of all candidates for the state teachers' certificate who are preparing to teach industrial subjects. Prerequisites: Mechanical Drawing II, Woodworking II, and Educational Psychology. Professor Williams.

The various lines of work included under the head of industrial arts are studied and a series of progressive lessons worked out in each of these lines emphasizing important elements. A study is made of the various materials employed and the methods of utilizing them for the needs of pupils. The arrangement of courses, the outlines and presentation of assignments, the preparation of assignments, the preparation of laboratory material and the conduct of laboratory exercises are taken up. The work includes recitations, class discussions, assigned readings and written reports.

141. SPECIAL METHODS IN THE TEACHING OF PHYSICS. Class work, four hours; laboratory, six hours. Three semester credits. Associate Professor Floyd.

(See Department of Physics, course 224.)

142. SPECIAL METHODS IN THE TEACHING OF MATHEMATICS. Class work, six hours. Three semester credits. Associate Professor Stratton.

(See Department of Mathematics, course 122.)

143. SPECIAL METHODS IN THE TEACHING OF HISTORY. Class work, four hours. Two semester credits. Professor Iles.

(See Department of History, course 127.)

144. SPECIAL METHODS IN THE TEACHING OF ENGLISH. Class work, six hours. Three semester credits. Professors Searson and Davis.

(See Department of English, course 134.)

160. SUPERVISED OBSERVATION AND TEACHING IN HOME ECONOMICS. By appointment. Three semester credits. Prerequisites: Foods I and II, Clothing I and II, and Special Methods in the Teaching of Home Economics. Associate Professor Edwards.

Students whose qualifications are accepted for this course will serve as teachers of sewing and cooking in the classes of the junior high school of Manhattan.

161. SUPERVISED OBSERVATION AND TEACHING IN AGRICULTURE. By appointment. Three semester credits. Expected of all candidates for

state teachers' certificates who are preparing to teach agriculture. Prerequisite: Educational Psychology. Professor Williams or Assistant Professor Davidson.

Students expecting to teach take this work as a part of the regular class in the School of Agriculture. The work is supervised by a member of the Department of Education and by the regular class teacher. Both teachers criticise lesson plans and presentation.

201. RURAL EDUCATION. Elective, first or second semester. Class work, fifth hour, M Tu W Th F S. Three semester credits. Prerequisite: Educational Administration. Professor Holton or Professor Williams.

This course deals with extension education, boys' and girls' club work, the problems of the rural high school, one-room schools, consolidation, social centers, farmers' organization, and all forms of organized community life in the open country, in so far as they bear on the problems of public education. A certain amount of field work is required in connection with the course.

211. MENTAL AND EDUCATIONAL MEASUREMENTS. Class work, sixth hour, M Tu W Th F S. Two semester credits. Prerequisite: Psychology. Professor Peterson.

This course is designed to give a working knowledge of the fundamental principles of educational measurement and an appreciation of the significance of the measurement movement in education. A careful study is made of standard educational tests and scales, with special emphasis upon their value in the improvement of classroom methods and conditions of learning. Attention is given to such statistical methods and devices as are needed for the interpretation of data.

221. EXTENSION METHODS AND PROBLEMS. Class work, sixth hour, M Tu W Th F S. Two semester credits. Professor Strickland.

The origin and development of extension work, its aim and purposes and relation to other general educational activities are briefly reviewed. The organization and administration of extension work under the Smith-Lever law and the part taken by colleges and the Department of Agriculture; types of extension work conducted by bankers, railroads, manufacturers, and other agencies and future problems of extension work, are studied.

222. RURAL ORGANIZATION. Class work, seventh hour, M Tu W Th F S. Two semester credits. Professors Holton and Burr.

In this course a study is made of the principles and projects of rural organized activities; the history and development of organizations for rural improvement and progress; the function of such organizations in promoting rural progress and welfare; and the organization, aims and accomplishment of typical rural organizations.

224. RURAL LEADERSHIP. Class work, eighth hour, M Tu W Th F S. One semester credit. Professors Holton and Burr.

This course is a study of the place and function of rural leadership in community development; of how leaders are developed and how they may be used by extra-community agencies in coöperating with the community in movements for community improvement.

FOR GRADUATES

301 and 302. EDUCATIONAL SEMINAR I AND II. Open to candidates for the master's degree. Class work, seventh and eighth hours, M F. Four semester credits on completion of both courses. Prerequisites: Psychology, and Educational Administration. Professor Holton and other members of the graduate faculty.

The work consists of lectures, reports, and class discussions. Each member of the seminar chooses a topic early in the term for special investigation. Preliminary reports are made to the class from time to time and the final results of the study are embodied in a carefully prepared report.

ENGLISH

Professor SEARSON
 Professor DAVIS
 Professor CONOVER

Associate Professor BURNS
 Associate Professor RICE
 Instructor WEST

52. ENGLISH GRAMMAR. Class work, second hour, M Tu W Th F S. Special review. Three semester credits in the School of Agriculture. Associate Professor Rice.

This course is arranged to help those who desire a rapid review of the essentials of English Grammar. Special exercises and drills will be given and clear emphasis will be placed upon the definite uses to which the student or teacher can put a knowledge of the essentials of English Grammar.

61. ENGLISH III. Class work, third hour, M Tu W Th F S. Library work, by appointment. Four semester credits in the School of Agriculture, or one-half unit for College entrance. Associate Professor Rice.

The work of this course consists of a study of American literature, class readings, class discussions, written sketches, abstracts, and outlines are required. The aim of the course is to familiarize the student with the masterpieces of his own countrymen, and to offer continued study in the cultural as well as the practical side of literature and language. Text: Cairn's *American Literature for Secondary Schools*, to page 147.

71. ENGLISH V. Class work, fourth hour, M Tu W Th F S. Three semester credits in the School of Agriculture. Associate Professor Rice.

This is a course in advanced composition. It includes instruction in the four forms of discourse, practice in the preparation of original themes, oral English, elementary debating, and a continuation of first year work in commercial usage. Texts: Hanson, *Two Years' Course in English Composition*, Part III; Davis and Lingham, *Business English and Correspondence*.

75. HIGH-SCHOOL DEBATE AND ORATORY. Class work, first hour, M Tu W Th F S. Special practice, by appointment. Three semester credits in the School of Agriculture. Associate Professor Burns.

This course comprises a thorough drill in coaching high-school debates and in teaching debating in the high school. Special assistance will be given to teachers who desire to collect and to prepare materials for high-school debates. The debating files of the College will be available for students taking this work.

101. COLLEGE RHETORIC I. Class work, third hour, M Tu W Th F S. Three semester credits. Associate Professor Burns.

This course consists of a rapid review of the principles of sentence structure, outlining, and paragraphing, followed by a study of the elements of effective writing in prose. In connection with the course systematic training is given in the writing of expository themes.

104. COLLEGE RHETORIC II. Class work, first hour, M Tu W Th F S. Three semester credits. Prerequisite: College Rhetoric I. Professor Conover.

College Rhetoric II continues the work of College Rhetoric I. Special emphasis is laid on expository and argumentative writing. Attention is directed to practical as well as to literary subjects for the frequent themes written throughout the course.

122. BUSINESS ENGLISH. Class work, first hour, M Tu W Th F S. Three semester credits. Professor Davis.

This course comprises a thorough review of business letter writing, exercises in writing contracts, notes, mortgages, wills, orders, sale bills, specifications, model story advertisements, and a practical study of other forms commonly used in connection with business.

128. ORAL ENGLISH I. Class work, second hour, M Tu W Th F S. Three semester credits. Prerequisite: College Rhetoric I. Associate Professor Burns.

In this course, a study of the principles of oral composition and descriptions, selling and other business talks, travel talks and speeches for special occasions, are offered. For materials for the exercises given in class, students are directed to cultural subjects, more particularly to painting, sculpture, architecture, and music.

134. METHODS OF TEACHING ENGLISH. Class work, third hour, M Tu W Th F S. Three semester credits. Professor Searson.

The teacher of English in the high school often feels the needs of new methods of presenting the subject. This course considers particularly the needs of the teacher who has had special training in home economics, agriculture, manual training, or general science, but who has not had such training in English. The class work consists of a systematic discussion of methods of teaching literature and composition in the high school and of awakening in the pupils a warm, vital appreciation of the best literature and of the best manner of directing composition work under the conditions met in the rural and smaller high schools. A definite program of work for the high-school year is constructed and discussed. The Department of English will accept the work of this course as a substitute for English Literature I.

140. LITERATURE FROM THE READERS. Class work, third hour, M Tu W Th F S. Three semester credits. Professor Davis.

This course is planned to meet the needs of teachers of rural and of graded schools. The aim of the course is to stimulate the teacher's love for good literature until she becomes conscious of her power to interest, impress, and inspire boys and girls. Reading is considered both as a fundamental means of acquiring knowledge and as a stepping stone to the appreciation of the world's best literature. Special emphasis is placed upon teaching children how to study the reading lesson, and upon the necessity to use in the reading lessons more of the literature of rural life. One hour each week is devoted to special methods of teaching reading.

177. ENGLISH LITERATURE I. Class work, third hour, M Tu W Th F S. Three semester credits. Prerequisite: College Rhetoric II. Professor Conover.

This course consists of special studies of narrative, lyric, and dramatic poetry, the novel, and the essay. The students are made familiar with the principles of literary appreciation and are taught to apply them in the intensive reading and study of standard selections.

180. ENGLISH LITERATURE II. Class work, fourth hour, M Tu W Th F S. Three semester credits. Professor Conover and Professor Davis.

A general survey of English literature from the earliest time to the present day is here offered. In addition, works of representative authors of each period are assigned for reading outside the classroom. These are discussed in class and passages from them interpreted.

271. THE ENGLISH BIBLE I. Class work, fourth hour, M Tu W Th F S. Three semester credits. Professor Searson.

This course familiarizes the student with the different kinds of literature found in the English Bible. A careful study is also made of the style of that great classic in order to discover the secrets of its simplicity, clearness, and power.

SHORTHAND. Class and laboratory drills, fifth and sixth hours, Tu W Th F. Three semester credits. Miss West.

Special instruction in shorthand and practical drills in application will be given to students and teachers desiring to prepare themselves as stenographers or to acquire rapid facilities for note taking. Stenog-

raphers desiring to increase their accuracy and speed in note-taking, as well as students desiring to enter upon this study and drill for the first time, will be admitted to the course by special arrangement with the instructor in charge.

TYPEWRITING. Class and laboratory drills, seventh and eighth hours, Tu W Th F. Three semester credits. Miss West.

Special laboratory instruction and drill will be given in typewriting. Typewriting from stenographic notes, from rapid dictation, and from the dictaphone, as well as expert drill in multiple copying, stencil cutting, and duplication will comprise leading features of the course.

ENTOMOLOGY

Associate Professor MERRILL
Assistant Professor SMITH

101. GENERAL ENTOMOLOGY. Class work, first hour, Tu W Th F, F 53. Laboratory, fifth, sixth and seventh hours, Tu Th, F 65. Three semester credits. Prerequisites: General Zoölogy I and II, or equivalent. Assistant Professor Smith.

This is a study of the elementary anatomy and physiology of insects, complete enough to give a thorough understanding of the life history and habits of the most important species, and the general principles upon which the control of these economic forms is based. It is a study of the more important general facts about insects as a class; the main characters of the different orders and groups; how they become fitted to survive and multiply; and how the structure and habits of one group render it susceptible to certain measures of control, while in other groups entirely different measures are necessary. Field work forms a limited part of the course.

111. APICULTURE. Class work, fifth hour, Tu W Th F. Laboratory, sixth, seventh and eighth hours, W F, AB. Three semester credits. Associate Professor Merrill.

This course comprises a general study of the structure, life history, general behavior, activities and products of the honeybee. Special attention is given to practical beekeeping, dealing with the best methods practical among beekeepers. A study is made of bee diseases and of the standard methods to be used in the eradication and control of them. A study is also made of the relations of bees to agriculture and horticulture.

228. ADVANCED APICULTURE. By appointment. One to three semester credits, depending upon the amount of work done. Associate Professor Merrill.

This course is open to those who have had General Entomology, Apiculture, or its equivalent. The work is largely individual and is outlined to suit the needs of persons registering for the course. Advanced and special work only is given.

INSECT LIFE. Class work, one hour; laboratory, nine hours, of which three will be field work. Two semester credits. Assistant Professor Smith.

This course is designed to meet the needs of elementary and high-school teachers of nature subjects. An acquaintance is sought with the common and most interesting insects, spiders and other arthropods of this locality. Several field trips will be made to different types of habitats and material for laboratory studies collected. As far as possible, important facts of life histories will be obtained from rearings in the laboratory. Each student will make a collection and methods of arranging material for exhibition will be illustrated. The lectures will cover necessary points of insect classification, how insects live and their place in nature.

HISTORY AND CIVICS

Professor PRICE
Professor ILES

Associate Professor JAMES
Assistant Professor PEINE

59. AMERICAN NATION I. Class work, 10:30 to 12, Tu W Th F S, E 2. Four semester credits in the School of Agriculture, or the first half-unit of American History for College entrance. Associate Professor James.

This course comprises a survey of American History from the discovery of America to the overthrow of the Federalist party in 1800. It deals with the establishment of the English colonies in America, the growth of social and political institutions in these colonies, the development of an American nationality, the struggle among European nations for possession of North America, the divergent English and American political theories, the causes and meaning of the American revolution, the schemes for financing the Revolutionary war, the European diplomatic entanglements, the relations of the Continental Congress and the state, the efforts to solve the problems of imperial organization, the Constitutional Convention, and the Federalist organization of the new government. Along with the political history of this period goes a study of America's economic development. Texts: West's *History of the American People*, and Bogart's *The Economic History of the United States*.

60. AMERICAN NATION II. Class work, 9 to 10:30, Tu W Th F S, G 51. Four semester credits in the School of Agriculture, or the second half-unit of American History for College entrance. Assistant Professor Peine.

This is essentially the course that is usually designated as American History II in the high-school curricula. It will cover the period from the election of Jefferson, in 1800, to the present time. Westward expansion, sectional differences, Kansas History, the Civil War, and especially the new industrial age, will be the points of emphasis. This course may be taken by any student whether or not they have had the first half of a high-school American History course. The texts will be the same as in American Nation I.

63. CIVICS. Class work, 7:30 to 9, Tu W Th F S, G 51. Four semester credits in the School of Agriculture, or one-half unit for College entrance. Assistant Professor Peine.

This course, while designed primarily to meet the needs of teachers of civics in grammar schools and in high schools and of those preparing for college, is intended generally as a preparation for the duties of citizenship. Therefore, the emphasis is laid upon the actual workings of American Government, with the due attention to recent changes and tendencies in state and nation. The text used is Guitteau's *Government and Politics in the United States*, Kansas edition, supplemented by assigned readings.

101. AMERICAN HISTORY I (Beginnings of the American Nation). Class work, first hour, M Tu W Th F S, F 56. Three semester credits. Professor Price.

This course gives special emphasis to the industrial phases of the origin and development of American nationality and democracy to the end of the War of 1812. It also includes our constitutional and political development, especially with reference to origin, basis, cause, and effect. It aims to develop historic-mindedness; that is, training the student to put himself in the other fellow's place and understand fairly "the why." The European origin and background of American history, the evolution of colonial life, industries, and institutions; why we became an independent nation; our westward expansion; the establishing of nationality, and

the development of government by the people, are phases definitely emphasized. Instruction is given by means of lectures, readings, and recitations.

103. AMERICAN HISTORY LECTURES. Class work, third hour, M S, F 56. No credit. Professor Price.

These lectures cover the whole period of American History, with special consideration of our international relations, our agricultural history, the history of Kansas, and the very recent period. They are based upon the American History Notebook, printed by the state for use in the schools of Kansas. Advice is given as to the best reading references on certain phases of our history; but there are no recitations and no examinations. These lectures are helpful to those who are taking any of the courses in American History, and should prove especially helpful to all teachers of this subject, whether in the grades or in the high school. These lectures are open to any one who is properly assigned to them, but regular attendance is required, as in any course.

121. ENGLISH HISTORY. Class work, first hour, M Tu W Th F S, F 2. Three semester credits. Associate Professor James.

A survey is made of the whole field of English history, with special emphasis on the modern period. The Tudor and Stuart regimes, with their bearings on constitutional and political advance and New World history, the growth and organization of the empire, the commercial and industrial revolutions, and more recent political, social and industrial developments, will be studied in as much detail as the time allows. Throughout, some notice will be taken of contemporary world history and of England's position in international affairs leading up to her part in the Great War. The course is based on Cheyney's *Short History of England* as a text, with lectures and assigned readings.

126. CURRENT HISTORY. Class work 7 to 8, M S, F 2. One semester credit. Associate Professor James.

The content of this course differs each semester from that of any other semester. The text for the course is a good weekly magazine, such as *The Independent* or *The Outlook*; but this is supplemented by such monthly periodicals as *The Review of Reviews*, *Current History*, and *World's Work*, together with the daily papers and some library references. The course is so conducted as to give a wide outlook on the world of today, and a better understanding of the conditions and institution in the midst of which we live. It includes a study of as much of the everyday essentials of American and foreign governments, of international relations, of international law, of biography, of industrial developments, and of history—suggested each week by the events of the week—as can be crowded into the one hour of the recitation period. It directs the student to good habits of news reading of the right sort.

127. TEACHER'S COURSE IN HISTORY. Class work, third hour, Tu W Th F, F 56. Two semester credits. Professor Iles.

This is a seminar course of discussion based on Henry Johnson's *Teaching of History in Elementary and Secondary Schools*, together with Mace's revised work, *Method in History*, and supplemented by a study of the Report of the Committee of Seven, and of the Committee of Five on *History in the Secondary Schools*, and the Committee of Eight on *History in the Elementary Schools*. A critical examination is made of special books on methods in history and civics, such as Wayland's *How to Teach American History*, and of special articles in the *History Teachers' Magazine*. The different texts in history and civics are critically investigated as to points of excellence or weakness, including lectures on the content or viewpoint of each. Information is also given as to the best illustrative material and helps in the teaching of history and civics. The course reveals the evolution in the writing of history, and the growing import-

ance of history and civics in the modern school curriculum, together with the improving viewpoint as to content of both the history and the civics courses.

151. AMERICAN GOVERNMENT. Class work, fourth hour, M Tu W Th F S, F 56. Three semester credits. Professor Iles.

This course in civics, or actual government, reviews definitely the fundamental principles and operations of our state and national governments, including the essential principles of constitutional law, but gives special emphasis to the actual present-day conditions and movements in our governmental and political life. Among the subjects especially studied are the initiative and referendum, suffrage and primary elections, the recall, city government and government of territories, the regulation of commerce, conservation of national resources, national defenses, taxation and finance, the actual methods of congressional activity, and the function, organization, power, and importance of political parties in our government. The course is primarily based on Munro's *The Government of the United States*. Throughout this course special and definite attention is given to recent and current events in governmental activities.

152. COMMUNITY CIVICS. Class work, first hour, Tu W Th F, F 53 or F 60. Four semester credits in the School of Agriculture, or one-half credit for College entrance for those receiving a grade above "P." Professor Iles.

This course deals chiefly with the functions of government as manifested in community life; the structural side of government is reviewed as far as necessary to show the means through which the functions are performed. While designed especially for vocational students, the course is open to teachers desiring work in community civics, and for them several carefully planned local projects are available. Text: Lectures and assigned readings.

153, 154. BUSINESS LAW I and II. Class work, fourth hour, Tu W Th F, G 51. Two semester credits. Assistant Professor Peine.

This course covers the general field of commercial law, with special attention to contracts, sales, bailments including common carriers, bills and notes, agency, and partnership. While the course is planned to present a broad rather than exhaustive treatment of present commercial practices, opportunity will be given students having special needs to make a closer study of particular phases of the subject. Text: Huffcut's *Elements of Business Law*. Use is also made of the Kansas Statutes, the Kansas form Book, and the Reports of the Kansas Supreme Court.

202. AMERICAN HISTORY II (Westward Expansion and Sectionalism). Class work, second hour, M Tu W Th F S, F 56. Three semester credits. Professor Price.

This course concerns itself with the industrial conditions, the issues and the leaders of the middle period of our history, from the close of the War of 1812 to the Civil War. Among the subjects investigated are the industrial and political conditions in America in 1816; the Missouri Compromise; the antislavery agitation; the Webster-Hayne debate; South Carolina nullification; annexation of Louisiana, Florida, and especially Texas; the Mexican War, and the resulting preponderance of the slavery issue; the Compromise of 1850; the Kansas-Nebraska bill and the early Kansas struggle "to the stars through difficulties," including the various constitutions and the final admission to statehood; the origin of the Republican party; the election of 1860; and the events leading immediately to the secession of the Southern states. Instruction is by means of lectures, recitations, and readings.

Courses numbered 101 and 202 are both based on Price's *American History Notebook* printed by the state for use in the Kansas schools, and includes a careful study of the state texts in American History for both the grades and the high schools, as well as our state text on Kansas History.

223. MODERN EUROPE (Since 1814). Class work, second hour, M Tu W Th F S, F 2. Three semester credits. Professor Iles.

This course traces the evolution of modern European nations since 1814, with special attention to political organization, industrial development, and colonial expansion. World readjustments, new governments and their boundaries, the League of Nations, political problems and social and economic adjustments due to the Great War are included. A desirable course for all who wish a large view and clear understanding of the Europe of to-day. Recitations, lectures, and assigned readings. Text, Hayes' *A Political and Social History of the Modern Europe*, vol. II.

INDUSTRIAL JOURNALISM AND PRINTING

Associate Professor ROGERS
Associate Professor KEITH

102. PRINTING PRACTICE. Laboratory practice, by appointment, twelve hours, K 2. Two semester credits. Associate Professor Keith.

A study of general printing-shop practice, including cost finding, is made in this course. The work is adapted to the needs of those taking it, but is intended particularly for high-school teachers of printing and for those who expect to have editorial supervision of publications, including high-school papers. Lectures are given on such subjects as the history of printing, artistic typographical arrangement, and the use of printing as an aid in the study of spelling, punctuation, and English composition. More advanced work will be given to students prepared for it.

107. ELEMENTARY JOURNALISM. Class work, second hour, Tu W Th F, K 55. Two semester credits. This course should be accompanied by Journalism Practice I to give four semester credits. Associate Professor Rogers.

This course is designed to give the student practical experience in the fundamentals of newspaper work. It is intended to prepare for more advanced courses in journalism or to give necessary training for effective use of the written articles in farm bureau, educational, and other vocational activities. Methods of obtaining news of various types, the writing of the lead, and the general style of the news story are carefully considered. The duties of the reporter and the physical, mental, and ethical demands made upon him are briefly presented. Attention is given to the history and scope of journalism.

110. JOURNALISM PRACTICE I. Laboratory practice, by appointment, twelve hours, K 55. Two semester credits. Associate Professor Rogers.

This course embodies actual practice in journalism, as closely approximated as possible to actual newspaper work. Students are required to gather news, both assigned and unassigned, and to write the stories in the department work room. The College campus is divided into "runs" which the students cover at regular intervals, and assignments are given at specific times as in a newspaper office. The work is adapted to the needs and qualifications of each student.

227. JOURNALISM FOR VOCATIONAL TEACHERS. Class work, third hour, Tu W Th F, K 55. Two semester credits. Associate Professor Rogers.

This course is offered for the purpose of meeting the demands for teachers who feel the need of special training in news writing and editing to enable them to use effectively publicity in connection with the work of their schools. How to write, edit, and publish a school paper, and how to write school news that will be acceptable to local papers, are taken up in the course. Several hundred newspapers and magazines received by the Department of Industrial Journalism afford practical material. Careful attention is given to the publication of high-school papers,

and problems of staff organization, editorial methods, business management, mechanical make-up, and faculty advice are discussed. A large number of high-school publications are available for use by students in the course. Actual practice on a model school paper will be required of each student taking the work.

MATHEMATICS

Professor WHITE
Associate Professor STRATTON

Instructor MCKITTRICK
Instructor LEWIS

53. BOOKKEEPING. Class work, second hour, Tu W Th F, A 73. Two semester credits in the School of Agriculture. Associate Professor Stratton.

The object of this course is to teach the fundamental principles of bookkeeping and accounting and their practical applications. Business papers will be used as a basis for the study of all business transactions. Texts: Lyons and Carnahan's *Bookkeeping*.

63. ALGEBRA I. Class work, 7:30 to 9, Tu W Th F S, G 52. Four semester credits in the School of Agriculture. Mr. Lewis.

This course includes a study of simple algebraic expressions and the use of the equation; a treatment of the methods of finding distances by means of scale drawings, similar triangles, and elementary trigonometric functions; a discussion of the various uses of graphs and of positive and negative numbers. Text: Rugg and Clark's *Fundamentals of High-school Mathematics*.

64. ALGEBRA II. Class work, 7:30 to 9, Tu W Th F S, G 54. Four semester credits in the School of Agriculture. Miss McKittrick.

This course takes up ratio and proportion, graphical representation, simultaneous equations, involution, evolution, theory of exponents, radicals, quadratic equations, and applications to practical problems. Text: Hawkes, Luby and Touton's *First Course in Algebra*.

66. PLANE GEOMETRY I. Class work, 1:30 to 3, M Tu W Th F, G 52. Four semester credits in the School of Agriculture. Miss McKittrick.

Books I and II of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course.

67. PLANE GEOMETRY II. Class work, 1:30 to 3, M Tu W Th F, A 74. Four semester credits in the School of Agriculture. Mr. Lewis.

Books III, IV, and V of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course.

71. SOLID GEOMETRY. Class work, 10:30 to 12, Tu W Th F S, A 74. Four semester credits in the School of Agriculture. Mr. Lewis.

This course comprises the usual theorems and constructions, including the relation of planes and lines in space, the properties and measurements of prisms, cylinders, pyramids and cones; the sphere and spherical triangle. The solution of many numerical and original exercises is required, and mensuration of surfaces and solids is treated. Text: Wentworth and Smith's *Plane and Solid Geometry*.

80. TEACHER'S COURSE IN ARITHMETIC. Class work, 11 to 12, Tu W Th F. Two semester credits in the School of Agriculture. Associate Professor Stratton.

This course is for rural and grade teachers and those interested in normal courses in arithmetic. The real problems of the classroom are taken up and discussed with a view to giving the teachers something definite to be used in their own school work. Modern movements and methods, and also a brief history of arithmetic will be given some consideration. Text: Stratton and Remick's *Agricultural Arithmetic*.

101. PLANE TRIGONOMETRY. Class work, 10 to 11, M Tu W Th F S, A 73. Three semester credits. Associate Professor Stratton.

Measurements of angles, functions of any angle, functions of multiple and submultiple angles, sum and difference formulæ are included in this course. Triangle and trigonometric equations are solved. Text: Palmer and Leigh's *Plane and Spherical Trigonometry*.

104. COLLEGE ALGEBRA. Class work, 9 to 10, M Tu W Th F S, G 54. Three semester credits. Miss McKittrick.

Elementary topics, functions and their graphs, quadratic equations are rapidly reviewed. The further treatment includes the subjects of complex numbers, theory of equations, permutations and combinations, partial fractions, logarithms, and determinants. Text: Rietz and Cra-thorne's *College Algebra*.

110. PLANE ANALYTICAL GEOMETRY. Class work, 9 to 10:30, Tu W Th F S, A 74. Four semester credits. Professor White.

Coördinate systems and applications; loci, the straight line, circle, parabola, ellipse, and hyperbola are studied in this course. The subject matter is that of the usual first course. Text: *Brief Course in Analytic Geometry*, by Tanner and Allen.

113. CALCULUS I. Class work, 7 to 9, Tu W Th F S, A 73. Five semester credits. Professor White.

The usual topics of differential calculus are considered, together with integration of standard forms, definite integrals, rational fractions, and integration by parts. This course contains problems closely related to work of engineering students. Text: Phillip's *Differential and Integral Calculus*.

116. CALCULUS II. Class work, 7:30 to 9, Tu W Th F, A 74. Three semester credits. Associate Professor Stratton.

The subject matter of this course belongs to the main to integral calculus. Emphasis is laid upon the applied side. Problems involving areas, lengths, surfaces, and volumes are treated by methods of single integration. The idea of successive and partial integration is applied to areas, moments, centers of gravity, surfaces, volumes, etc. The types of differential equations which the student of engineering is most likely to meet with in his subsequent work are briefly discussed. Text: Phillip's *Differential and Integral Calculus*.

123. TEACHERS' COURSE IN HIGH-SCHOOL MATHEMATICS. Class work, 3 to 4, Tu Th, A 73. One semester credit. Professor White.

This course undertakes an examination of the subject matter and methodology of high-school mathematics. It includes a study of high-school needs and of high-school courses in algebra, geometry and trigonometry, with bibliographies and other sources of assistance in teaching high-school mathematics. The course includes also a study of the mathematical situation of the past decade as regards the high-school, with present outlook problems and purposes. The work proceeds by readings, lectures, and reports. The student should have as a basis of his work Young's *The Teaching of Mathematics*.

MODERN LANGUAGES

French

Assistant Professor LIMPER

151. FRENCH I. Class work, second hour, M Tu W Th F S, N 60. Three semester credits. Assistant Professor Limper.

The phonetic symbols being a great help in the acquisition of accurate pronunciation, the first two days are devoted to learning these symbols and a number of useful expressions in French. The recitations

are conducted largely in French and considerable time is devoted to conversation. Nevertheless, conversation is considered merely a means to the acquisition of a reading knowledge of French. The fundamentals of grammar are covered in this semester and reading matter in the grammar is supplemented by a reader. Text: Olmstead's *Elementary French Grammar* (first twenty-two lessons) and Allen and Schoell's *French Life* (thirty pages).

161. FRENCH READINGS. Class work, third hour, M Tu W Th F S, N 60. Three semester credits. Assistant Professor Limper.

This is essentially a reading course, the purpose being to enlarge the student's vocabulary. Grammar is reviewed and considerable time is devoted to conversation. Fontaine's *En France* and one other short French text are read.

251. FRENCH SHORT STORIES. Class work, sixth hour, M Tu W Th F S, N 60. Three semester credits. Assistant Professor Limper.

This is a combined reading, composition, and conversation course. The reading of some of the best stories of a number of modern French short-story writers serves as a basis for exercises in composition and conversation. Special attention is paid to correct accent and idiomatic expressions.

270. TEACHERS' COURSE IN FRENCH. Class work, fourth hour, M Tu W Th F S, N 60. Three semester credits. Assistant Professor Limper.

The subject matter of this course falls under four heads, namely: pronunciation, grammar, reading material, and work outside of the regular curriculum. Under the first heading the physiological basis for the production of the sounds peculiar to the French language are treated. Under the second heading not only are methods of presenting grammar dealt with, but a thorough and systematic review of the subject is included. The third division consists of a careful examination of the various reading texts used in the state. Under the fourth, methods of conducting a *Cercle francais* and material to be used in it are treated.

Spanish

Instructor HESSE

176. SPANISH I. Class work, first hour, M Tu W Th F S, N 58. Three semester credits. Miss Hesse.

In this course nouns, adjectives, pronouns, demonstratives and numerals are treated and the indicative of verbs is studied. The course is largely conducted in Spanish, the student gradually acquiring a fair-sized and practical vocabulary. Text: Hill's and Ford's *First Spanish Course* (first thirty-one lessons).

177. SPANISH II. Class work, second hour, M Tu W Th F S, N 58. Three semester credits. Miss Hesse.

This is a continuation of Spanish I. The last half of the course is devoted entirely to a reader, this being used as the basis for conversation and composition. Texts: Hill's and Ford's *First Spanish Course* (completed), and Berge-Soler and Hatheway's *Elementary Spanish-American Reader*.

180. SPANISH READINGS. Class work, fifth hour, M Tu W T F S, N 58. Three semester credits. Prerequisite: Spanish II. Miss Hesse.

This is a combined reading, conversation and composition course. A modern Spanish novel is used as a text. Special attention is given to correct pronunciation and idiomatic expressions.

MUSIC

Professor WESTBROOK *
 Assistant Professor SMITH
 Instructor KIMMELL
 Instructor LEFFLER *

Instructor HANNEN
 Instructor CERRY *
 Instructor LOVEJOY *

101. HARMONY I. Class work, third hour, Tu W Th F, M 29. Two semester credits.

The course in harmony includes the study of scales and intervals, bases and melodies, ear training, the chord of dominant seventh, and keyboard harmony. Students contemplating teaching music in public schools will find this work invaluable to them, as it is the grammar and mathematics of music. At least five must enroll for harmony or the class will not be organized.

110. HISTORY OF MUSIC I. Class work, second hour, W F, M 29. One semester credit.

A brief survey of the primitive development of the art is given, together with special attention to the classical and romantic periods and present-day conditions and tendencies. The work is made especially interesting by use of copious illustrations on the phonograph.

120. SCHOOL MUSIC METHODS I. Class work, third hour, Tu W Th F, M 29. Two semester credits. Professor Westbrook.

This course is a general survey of music in public schools from the primary grades through the high school. Methods of presenting music to children in the different stages of development are taught and materials for such work are studied. Suggestions for community music work are also given.

130. VOICE. Private instruction. Professor Westbrook and Mr. Lovejoy.

Hours to suit the convenience of students are arranged for those wishing private vocal instruction. For two half-hour private lessons a week one credit is given.

135. VIOLIN. Private instruction. Miss Hannen.

This work is organized after the same plan as vocal instruction. Credit of one hour is given for private instruction.

140. PIANO. Private instruction. Assistant Professor Smith.

This work is organized the same as Voice and Violin and a special piano teacher is in charge.

150. CHORUS. 4:30 to 5:55, Tu Th, M 26. One semester credit. Professor Westbrook.

Every student enrolled in the Summer School is urged to sing in the chorus. This work will be the study and public presentation of beautiful choruses.

151. ORCHESTRA. 4:30 to 5:55, M W, M 26. One semester credit. Every individual who plays an orchestral instrument is urged to bring that instrument and play in the Summer School Orchestra. High-grade orchestra music is studied and is presented in public performances.

* Resigned.

PHYSICAL EDUCATION

Professor AHEARN
Assistant Professor BACHMAN

Assistant Professor KNOTH
Assistant Professor BOND

COURSES FOR MEN

Courses for men are designed primarily to instruct men who desire expert practical knowledge of the best methods of coaching football, baseball, basket ball, and track and field athletics. These courses should appeal strongly to men who plan to take up coaching as well as men already engaged in coaching in high schools and colleges. These courses will be conducted by lectures and by practical demonstrations.

Throughout all the courses, lectures and demonstrations will be given on the care and prevention of injuries, how to guard against injuries, how to care for them, and the best methods of bandaging sprains and weak joints.

126. FOOTBALL. Class work, four hours. Two semester credits. Assistant Professor Bachman.

This course will cover the following phases: Spirit of the game, discussion of the rules, tackling the dummy, charging sled, defense in general, line defense, secondary defense, kick-off, punting, place kicking, drop kicking, direct pass plays, systems of offense in general, quarterback pass plays, interference, signals, training, and equipment.

130. BASKET BALL. Class work, two hours. One semester credit. Professor Ahearn.

The work will cover the discussion of the rules, technique of basket shooting, foul throwing, catching and passing, dribbling, reverse turn, different styles of play, offense, defense, team work, selection of players, training and equipment.

135. BASEBALL. Class work, two hours. One semester credit. Professor Ahearn.

The course will cover the discussion of the rules, fielding, batting, bunting, base running, sliding, team work, pitching, catching, proper way to play each position, indoor and outdoor practice methods, coaching, signals, training and equipment.

140. TRACK AND FIELD SPORTS. Class work, two hours. One semester credit. Assistant Professor Bachman.

This course will cover the discussion of the rules, starting, sprinting, distance running, hurdling, jumping, vaulting, shot putting, discus throwing, javelin throwing, training, dieting, and equipment.

142. THEORY OF PHYSICAL EDUCATION AND PLAYGROUND MANAGEMENT. Class work, two hours. One semester credit. Assistant Professor Knoch.

The theory of the various systems of physical education is studied. The philosophy of play, and the organization and equipment of the playground are considered.

144. CALISTHENICS AND GAMES. Class work, six hours. Three semester credits. Assistant Professor Knoch.

In this course the following topics are studied: Calisthenics with and without hand apparatus, including gymnastic marching tactics; personal proficiency in execution and exactness of form; progression and value of system in these exercises; use of wands, clubs, dumb bells, etc.; practice teaching; plays and games to meet the requirements of children of all ages; simple teams, group and competitive teams.

146. ADMINISTRATION AND ORGANIZATION IN PHYSICAL EDUCATION. Class work, two hours. One semester credit. Assistant Professor Knoch.

Problems in administration and organization of work in physical education are taken up. Intercollegiate, intra-mural, and mass athletics are studied. Sportsmanship and ethics are considered.

COURSES FOR WOMEN

175. GYMNASTICS. Class work and practical work, second hour, N 1, M W F. One semester credit. Assistant Professor Bond.

This course is planned for the needs of the teacher in the public schools where no special teacher is employed for this work. Lectures are given on the general theory of gymnastics and the grading of free exercises. A note book is required.

The practical work includes free exercises, apparatus, and practice teaching.

178. FOLK DANCING. Class work and practical work, sixth hour, M W F. One semester credit. Assistant Professor Bond.

Lectures are given on the use of folk dances in social work, in the school room and the gymnasium and on adapting them for use in festivals, fetes, etc. A note book is required.

The practical work includes graded folk dances of the different nations, and practice teaching.

181. GAMES. Class work and practical work, third hour, M W F. One semester credit. Assistant Professor Bond.

Lectures are given on the grading of games, and the physiological benefits derived from the different activities.

Practical work offers simple group and circle games, quiet games, and a few of the more highly organized competitive team games, and practice teaching.

182. PLAYGROUND MANAGEMENT. Class work, fourth hour, M. Practical work to be arranged. One-half semester credit. Assistant Professor Bond.

This course includes discussions of the organization and administration of playground activities, equipment, and practical experience in conducting some playground hours.

184. INTERPRETATIVE DANCING. Class work and practical work, seventh hour, M Tu W Th F. One semester credit. Assistant Professor Bond.

This course aims to teach dancing, not dances, through logical, conscious control of body movements, motivated by music which has been studied and is understood. This study of music includes the simple, common rhythms, which are easily adapted to many uses.

190. SWIMMING W. Eighth hour, Tu W Th F. No credit. Assistant Professor Bond.

PHYSICS

Professor HAMILTON
Associate Professor FLOYD

Assistant Professor CONVERSE
Assistant Professor BRACKETT

9. LABORATORY TECHNIQUE. Laboratory course, two periods a week. Three semester credits. By appointment. Associate Professor Floyd.

This course includes saw filing and tool grinding; glass blowing, cutting, grinding, polishing, and cementing; metal filing, drilling, soldering and brazing; and making a set of punches, reamers, and cold chisels.

Students may, in certain cases, undertake problems chosen from the following at a cost covering the raw materials: Making a mercury-in-glass barometer; a seconds' pendulum; an accelerated motion machine; a fourteen-in-one laboratory tool; a Berthelot calorimeter; small induction coil; wireless apparatus; rheostats for power circuits; Langeub galvanometer; velocity of sound apparatus, photometer, etc.

31. GENERAL SCIENCE. Class work, second hour, M Tu W Th F S, C 60. Three semester credits for admission; no college credit. Assistant Professor Converse.

This course is intended for those teachers who are required to offer courses in general science in public-school work. The course includes class, laboratory and field work. It is based on such everyday problems as: water supply, air supply, weather predictions, light supply, prime motors, transportation, crops, and similar problems, with a study of what science in general has done and can do to solve them. Text to be selected.

41. INTRODUCTORY PHYSICS. Class work, third hour, daily, C 60. Laboratory, fifth, sixth, and seventh hours, Tu. Three semester credits for admission; no college credit. Assistant Professor Converse.

This course is designed for those teachers who desire some knowledge of elementary physics and yet have not time to take the three regular courses offered in this subject. The entire subject is covered and some time given to working problems. Simple experiments and demonstrations are given. The course is a good review for those who have had high-school physics. Students who expect to take county examinations for certificates to teach are advised to take this course. Text: Black and Davis' *Physics*.

51, 61. ELEMENTARY PHYSICS I (A-1, H-1). Class work, first hour, daily, C 63; laboratory, fifth, sixth, and seventh hours, Tu Th, C 38. Four semester credits in the School of Agriculture. Prerequisite: Algebra III. Assistant Professor Brackett (class work); Assistant Professor Converse (laboratory).

This course is intended to give a general view of mechanics, sound, and heat. Special emphasis is placed upon principles which will be met again in later work in the same or other sciences. Text: Black and Davis' *Physics*.

52, 62. ELEMENTARY PHYSICS II (A-II, H-II). Class work, fourth hour, daily, C 63; laboratory, fifth, sixth, and seventh hours, W F, C 38. Four semester credits in the School of Agriculture. Prerequisite: Course 51 or 61. Assistant Professor Converse.

This is a continuation of Elementary Physics I and includes a study of light, magnetism, and electricity. The fundamental laws are studied and illustrated and the working principles of many electrical appliances in daily use are made the subject of class discussion.

101. HOUSEHOLD PHYSICS. Class work, second hour, daily, C 63. Three semester credits. Professor Hamilton.

Laboratory, fifth, sixth, seventh and eighth hours, Tu Th. One semester credit. Professor Floyd.

This is a course of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light with its color phenomena and actinic effects; of some of the optical instruments used in scientific work; a study of electric lighting and illumination of the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliances and of the operator.

Laboratory.—Tests are made of practical household appliances such as vacuum cleaners, pressure cookers, small motors, and other physical equipment used in house work.

120. PHOTOGRAPHY. Class work, eight hours, M W; laboratory, six hours, by appointment. Two semester credits. Professor Hamilton.

The importance of a record of exact details, as shown in photography, makes this work valuable to all scientists. The course gives the student

some knowledge of chemical and physical principles involved in the art, as well as practice in making good negatives and prints. The lecture and laboratory work deals with things to be considered in selecting a camera; proper exposures; composition of pictures; proper development of plates; tests of different developers; retouching; reducing and intensifying negatives; printing and mounting; making lantern slides, bromide enlargements, and the prints best adapted for illustrative articles in newspapers and magazines.

201, 211. COLLEGE PHYSICS I (GENERAL PHYSICS I, or ENGINEERING PHYSICS I). Class work, 7:30 to 8:55, Tu W Th F S, C 62. Professor Floyd. Laboratory, fifth, sixth, seventh, and eighth hours, Tu Th. Assistant Professor Brackett. Five semester credits.

This is a course in mechanics, heat, and sound. It or its equivalent is required of general science and engineering students. The course is intended to give the student a thorough working knowledge of the fundamental units and laws involved in force, work, power, and energy, with a discussion of the fundamental laws of gases and liquids, as they occur in the transformation and transmission of force and energy. Textbook, Kimble's *College Physics* or Reed and Guthe's *College Physics*.

Laboratory.—The laboratory work consists in the use of apparatus devised for testing the laws of inertia, moments of force, moments of torsion, and electricity, together with measurements in thermometry and calorimetry.

202, 212. COLLEGE PHYSICS II (GENERAL PHYSICS II or ENGINEERING PHYSICS II.) Class work, 10:30 to 11:55, Tu W Th F S, C 62. Professor Hamilton. Laboratory, fifth to eighth hour, W F, C 38. Assistant Professor Brackett. Five semester credits.

This is a course in electricity and light. It or its equivalent is required of general science and engineering students. The work in electricity is of such a nature as to give a working knowledge of the units employed, and of the fundamental laws; and to acquaint the student with methods of producing a current, its uses, and the system by which electrical energy is measured. The principal phenomena of light, together with the laws that may have a direct bearing upon light as a standard and method of measurement, are treated in this course. Text: Kimble's *College Physics* or Reed and Guthe's *College Physics*.

224. SPECIAL METHODS IN THE TEACHING OF PHYSICS. Class work, fourth hour, Tu W Th F, C 60; laboratory and library, fifth to eighth hour, W F, C 36. Three semester credits. Associate Professor Floyd.

The course includes a study of the modern texts, manuals, and methods in high-school physics. Students are given an opportunity to help assemble apparatus and to assist in lecture demonstrations, such as lantern, X-ray, manipulation of generator and motor, induction coils, storage cells, spectroscope, nickel-plating, etc. The laboratory includes the usual experiments required in the elementary course in physics. The purpose of the course is to discuss methods best adapted to the presentation of those topics which present special difficulty, to advise methods of illustrating and demonstrating the fundamental principles, and to select from a large number of possible laboratory experiments a list which might be used in any of our high schools of Kansas. This course is intended for those who are either teaching or expecting to teach physics in secondary schools.

PUBLIC SPEAKING

Professor EMERSON

201. EXTEMPORE SPEECH I. Class work, second hour, Tu W Th F, G 56. Two semester credits. Professor Emerson.

The work of this course consists in the preparation and delivery of short addresses based on prepared outlines. Careful preparation of material is required. The plan of the speech is made in advance but the choice of language is left for the moment of speaking. Criticism and points of theory, given by the instructor, supplement the practice work. Conviction, not entertainment, is the dominant purpose in the course.

204. DRAMATICS. Class work, fourth hour, Tu W Th F, G 56. Two semester credits. Professor Emerson.

This is not an elaborate study of the drama, but aims to give instruction in dramatic presentation. Practice work predominates. Special attention is paid to "home talent" or amateur theatricals, and methods of coaching are suggested. The "Little Country Theater" idea is developed, and special training is given in character "make-up."

205. PUBLIC SPEAKING FOR TEACHERS. Class work, third hour, Tu Th, G 56. One semester credit. Professor Emerson.

This course is designed, first, to give the teacher training in the art of reading and speaking from the public platform; second, to give the teacher a knowledge of the principles of public speaking as they apply to pedagogy. Practice work predominates. The situation in the grades and high schools is covered. Special emphasis is placed upon the teaching of reading in the schools.

220. SUMMER SCHOOL PLAY. Professor Emerson. The Department prepares and presents during the session one amateur play. The Summer School plays are of a standard type, good royalties being paid to secure them. Any student enrolled in the Summer School is eligible to try out for the cast. Practice as arranged.

ZOOLOGY

Associate Professor HARMAN
Instructor BROWN

105. GENERAL ZOÖLOGY. Class work, fourth hour, daily F. Laboratory, 7 to 10, Tu W Th F, F 63. Five semester credits. Required in the curricula in agriculture and home economics; with an extra credit hour will satisfy the requirement in general science. Miss Brown.

The structure and functions of types of both invertebrates and vertebrates, and animal relations, are studied in the class and on field trips.

Laboratory.—Studies are made of the form and function of types of living animals, and dissections and reconstructions made of the important systems of selected types. A considerable part of the laboratory time is spent in the field identifying and studying animals in their natural relations.

108. EMBRYOLOGY AND PHYSIOLOGY. Class work, third hour, daily, F 60. Laboratory, fifth, sixth and seventh hours, Tu W Th F, F 63. Five semester credits: Prerequisite: General Zoölogy or its equivalent. Required in the curricula in home economics. Associate Professor Harman.

The first three-fifths of the term is devoted to (a) embryology and the remaining two-fifths to (b) human physiology. The course thus falls into two closely related parts: (a) a study of the development of the

germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth with special reference to the human; and (b) a study of the functions of the organs and systems of the human body, with special consideration of the digestive, respiratory, circulatory, nervous, and urino-genital systems and organs of special sense.

Laboratory.—The laboratory work includes: (a) Studies of male and female germ cells, stages in the process of fertilization, the segmenting ovum, and whole mounts and serial sections of the chick and pig embryos in several stages of development, with demonstrations of types of mammalian foetal relations, and (b) experiments for the demonstration of the composition and functions of bone, blood, lymph, and the reaction of muscles, nerves, parts of the digestive, respiratory, excretory, and other systems.

Division of College Extension

HARRY UMBERGER, *Dean*

The people of Kansas believe in using their educational institutions to their full capacity, not only for the students privileged to come to them, but also for the state at large. They know that the number who complete a College course in agriculture, engineering, or home economics is small in comparison with the great majority of the people who cannot go to college, and it is their wish that this majority also may be served. With this desire the Agricultural College is in full sympathy, and it is its ambition, not only to give its resident students the best possible training for leadership in life's work, but to be of direct service to every community of the state.

As far back as 1864 conventions of the farmers of Manhattan and vicinity were held at the College. The first well-organized farmers' institute conducted under the auspices of the Faculty was held at Manhattan, November 14, 1868, and this was followed by a similar gathering at Wabaunsee, November 21 and 22 of the same year. In 1868 the Board of Regents adopted a resolution recommending "that a system of lecturing on agricultural subjects at this College and the populous settlements of the several counties of the state should be conducted so that the benefits of farming according to correct agricultural principles may be disseminated throughout the state."

A few meetings were held each year for the next several years, increasing in number from 1879, but no definite appropriation for extension work was made until 1899, when \$2,000 per year was appropriated for this purpose by the state legislature. The annual appropriation remained at this figure until 1905, when the legislature appropriated \$4,000 for the work, to which the College added \$800. Up to this time no regular staff for extension work was employed, and all extension activities were conducted by a committee. In October of that year, however, a superintendent to organize the institute work was selected by the Board of Regents, and in July, 1906, the Department of Farmers Institutes was formally organized.

The interest in extension work throughout the state then developed rapidly. In 1907 the legislature appropriated \$10,500 for the two years, to which the College added \$1,000. In 1909 \$52,500 was appropriated by the legislature for the biennium, and the following appropriations were made by the succeeding legislatures: for biennium 1911-'13, \$75,000; for the biennium 1913-'15, \$95,000; \$92,922.72 for 1915-'17; for the biennium 1917-'19, \$71,260.54; and \$69,000 for the biennium 1919-'21.

In 1914 the Smith-Lever law was enacted by the Federal Congress, requiring the states to duplicate the amount appropriated by Federal Congress to each state, with the exception of \$10,000. Pursuant to this act

the state legislature appropriated for the biennium 1915-'17, \$41,240.45; for the biennium 1917-'19, \$89,758.65; and \$138,276.85 for the biennium 1919-'21.

This rapid development of extension work was made possible not only because the people of the state wished to have such work done, but because much new light has been thrown on the essentials in agriculture by the effective experimental work done by the Experiment Stations and by the United States Department of Agriculture.

In 1914 the Federal government felt that the useful and practical information on subjects connected with agriculture and home economics developed by the experiment stations, by the Department of Agriculture, and by the experience of the best farmers and farm homes should be made more readily available to everyone; and in order that it might be more fully and effectively diffused among the people of the several states and its practical application encouraged, the Congress of the United States, in 1914, passed the Smith-Lever bill, which provides for "coöperative agricultural extension work between the agricultural colleges in the several states receiving the benefits of an act of Congress approved July 2, 1862, and of acts supplementary thereto, and the United States Department of Agriculture." To further this act the Congress provided for an annual appropriation of \$480,000, of which \$10,000 is paid each year to each state which assents to the provisions of the act. This initial appropriation is increased each year for seven years, such increase being allotted annually to each state in the proportion which the rural population of such state bears to the total rural population of all the states, providing an equal sum has been appropriated for that year by the legislature of such state, or has otherwise been provided from within the state, for the maintenance of the coöperative agricultural extension work.

Under this act the coöperation of the agricultural colleges and the United States Department of Agriculture has been assured, extension work has become a national as well as state project, and its effectiveness has been greatly increased.

The governor of the state and the Kansas legislature of 1914 accepted the provision of the Smith-Lever act immediately, and \$10,000, therefore, was secured from the Federal government for extension work for the year ending July 30, 1915. The additional sums coming from the Federal funds under this act to the state for the year ending June 30, 1916, and 1917, respectively, were \$14,555.45 and \$26,685, for the years 1918 and 1919, \$38,816 and \$50,946, respectively; and for the years 1920 and 1921, \$63,073.65 and \$75,203.20, respectively. These sums were offset by an equal appropriation by the legislature of Kansas, and in addition, from the appropriation made to the Agricultural College for all its work, \$34,000 was set aside for extension work for the year ending June 30, 1920. During the war Congress made an emergency appropriation to extension work, in order that special attention might be given to maximum production of food, conservation and economic utilization of farm products. This appropriation terminated June 30, 1919. There was such great demand for continuation of much of the work started under this appropriation with a view to carrying it on on a more constructive and permanent basis, that Congress appropriated funds for this purpose, effective

July 1, 1919. This is known as the supplementary Federal Smith-Lever appropriation. The total sum for extension work under the Smith-Lever act and from state funds for the year ending June 30, 1920, therefore, is as follows: From the Federal government, through the Smith-Lever act, \$73,073.65; from the Federal government through the supplementary Smith-Lever appropriation, \$36,388.65; from the state through the Agricultural College, \$34,000; from the state direct, appropriation to offset the Smith-Lever appropriation, \$63,073.65; from county appropriations as offset to the supplementary Federal Smith-Lever appropriation, \$36,388.65; total, \$242,924.60.

County funds are appropriated for the support of county farm bureaus through a special act of the legislature enabling the county commissioners to levy a direct tax for this purpose. (Session Laws of Kansas for 1915, p. 204, ch. 166, sections 1, 2 and 3; Session Laws of Kansas for 1919, p. 217, ch. 157, sections 1, 2 and 3.)

The rapid growth of extension work has demanded efficient administrative machinery. In the judgment of the president of the College and the Board of Regents it became necessary to create, in December, 1912, a Division of College Extension coördinate with the other divisions of the College. This at first was subdivided into four distinct sections or departments, but the increase in work and personnel of the division has made necessary a reorganization into eight departments, namely: institutes and extension schools, county-agent work, boys' and girls' club work, home economics, home demonstration-agent work, drainage and irrigation engineering, rural service, and home-study service, each with its own head and staff. The heads of the departments are responsible to the director, who is dean of the Division of College Extension. Through this organization it is possible to administer the extension work effectively and economically, to reach directly more than 500,000 people in the state each year, and to conduct some activity in every county.

Publications covering practical subjects in the field of agriculture, home economics and rural engineering are issued from time to time by the Division of College Extension as bulletins, circulars and leaflets. The authors of these publications are the extension specialists or the specialists of the departments in the other divisions of the College. The regular publications of the Agricultural Experiment Station also are used extensively in the extension work. A series of publications in coöperation with the United States Department of Agriculture is receiving special attention. Extension publications are mailed regularly to a list, composed of members of farm and home institutes, home-makers' clubs, extension schools, and farm bureaus; *i. e.*, to members of organizations coöperating closely with the Agricultural College. Any citizen of the state, however, on request, may secure copies of individual publications.

While the extension work is directed by the Division of College Extension for administrative efficiency, its scope would be limited were it not for the close coöperation of the other divisions and departments of the College, which help not only in supplying lecturers for agricultural meetings and extension schools, material for publication, assistance in demonstration work and helpful counsel, but also are responsible for all subject matter taught by the extension specialists.

Institutes and Extension Schools

T. J. TALBERT, Superintendent

MABLE CALDWELL, Extension Journalist
N. L. HARRIS, Poultry
L. E. WILLOUGHBY, Crops
*P. L. DEPUY, Zoölogist
E. B. WELLS, Soils
E. G. KELLY, Entomology
ROY W. KISER, Animal Husbandry

*CARL G. ELLING, Animal Husbandry
C. R. GEARHART, Dairy
W. T. CRANDALL, Dairy
L. C. WILLIAMS, Horticulture
T. A. CASE, Animal Diseases
E. A. STOKDYK, Plant Pathology
H. E. REED, Animal Husbandry

The Department of Institutes and Extension Schools has direct supervision over approximately 350 farm and home institute organizations, all two-day and three-day extension schools in agriculture and home economics, and the work of the extension specialists.

Each farm and home institute of the state is an association or farmers' club, with regular officers, constitution and by-laws, and is required by law to meet at least annually. While some organizations hold six or more monthly meetings, practically all of them have no fewer than three monthly meetings, because no institute organization can obtain state aid unless it has at least three meetings in addition to the annual meeting at which some representative of the College is present. The College plans to send two specialists, one in agriculture and one in home economics, to present at the annual meeting certain well-defined lessons. The specialists and their subjects are chosen because of a known need or interest in a particular community or a plan to start or encourage certain definite lines of work.

The programs for all annual meetings are based on suggestive outlines sent out by this department. These are completed and returned by the local officers. The department furnishes literature, on request, for members who are to take part in the program of an institute, grange, farmers' union or other organization.

The monthly meetings which are held by many of the local organizations in this state are an important feature of the institute work. These meetings are usually held on the second Saturday afternoon of each month from September to May. The Department of Institutes and Extension Schools suggests the subject for discussion, and the same subject may be discussed in every institute in the state. In this way certain important, timely subjects are being discussed by thousands of farmers and their wives at seasonable times, thus promoting a general uniformity of action.

Each year some special topics, such as farm management, the management of live stock, gardening, some phase of dairying, etc., are made especially important in institute programs, either for the whole state or for certain specified districts. During 1919-'20 the monthly meetings were largely concerned with the consideration of topics of value to farmers and their wives interested in increased production and in establishing their agricultural program upon a peace-time basis.

* The U. S. Department of Agriculture coöperates in furnishing directly all or a part of the salaries and the franking privilege.

Every institute has a membership paying a membership fee. The membership lists constitute the mailing list for the publications issued by this department. In addition to receiving these pamphlets each member who fills out and returns a membership blank receives from the College, from the government or from some state experiment station such other obtainable literature as his interests demand.

EXTENSION SCHOOLS

The demand among men and women for instruction in the essentials of agriculture and home economics is steadily increasing. Owing to the nature of the farm and home institutes, they are able to meet this demand only in part, and for that reason extension schools or short courses in agriculture and home economics have been organized in communities which desire more complete courses in these subjects than can be given at the institutes.

The College now conducts extension schools in agriculture and home economics of from two to five days' duration, sending to each school three or four instructors. Here well-planned, comprehensive courses are given in the various lines of agriculture and home economics, so that some of the essentials of these subjects may be learned. The local committees are required to organize the classes and pay the local expenses for each school. The Agricultural College supplies the teachers and pays their traveling expenses from funds appropriated to it for this purpose.

In addition to these general schools, special schools in breeding, animal diseases, dairying, poultry, orcharding, road making, and cement construction are held in communities desiring them and willing to defray the local expenses. Five-day schools in home economics may be had on request.

Extension schools are popular where the communities are brought to understand the work given. Almost every community which has had one school has petitioned for another. Increased interest is being manifested in the extension schools, and it is believed that more requests will be received in 1921 for schools than the College will be able to schedule with its present force of extension workers.

EXTENSION SPECIALISTS

The specialists of this department work in extension schools and institutes during the winter months only, and a portion of this time is devoted to coöperative demonstration work. During the spring, summer and fall they conduct special campaigns, such as silo building, wheat improvement, grasshopper control, cow testing, hog-cholera control, and other campaigns, and coöperative demonstration work. The latter phase of the work of the extension specialists is being especially met by the organization of coöperative demonstration work in each branch of agriculture in a certain number of counties each year. In much of the coöperative work each specialist has from two to ten coöperators in each county. These men and women work under the direction of the special-

ists and the supervision of the county agents, keep records of the work, and call demonstration meetings at their farms on each trip of the specialist. The number of visits which each specialist makes to each point varies from two, in the case of the specialist in soils, to six, in the case of the specialist in horticulture and entomology. The aim in all of this coöperative demonstration work is to show as well as to explain. This line of work is especially appreciated, and the representatives of the department have been able to meet only a fraction of the demands upon them.

Educational work in hog cholera is conducted in counties where the Agricultural College is requested to put it on. One veterinarian devotes all of his time to this work, holding educational meetings in every community, until every farmer has had opportunity to attend a meeting near his home.

The calls for the extension specialists in all lines of work are so many that it is impossible to meet more than two-thirds of the calls for assistance from county agricultural agents and from farmers' organizations. While the number of specialists is being increased rapidly, yet the work is growing far more rapidly, this indicating a healthy condition.

The specialists also devote from one to two months to judging the live stock and agricultural products at county and local fairs, which furnish an excellent opportunity for lectures and demonstration work.

County Agent Work*

KARL KNAUS, County Agent Leader
 A. F. TURNER, Assistant County Agent Leader
 F. A. DAWLEY, Assistant County Agent Leader
 A. L. CLAPP, Assistant County Agent Leader
 G. W. SALISBURY, Assistant County Agent Leader
 E. L. RHOADES, Farm Management Demonstrator

COUNTY AGENTS

JAMES A. MILHAM, Allen County
 F. S. TURNER, Anderson County
 H. F. TAGGE, Atchison County
 WARD R. MILES, Barton County
 A. C. MALONEY, Bourbon County
 H. S. WISE,⁶ Butler County
 J. A. HENDRIKS, Chase County
 ROY E. GWIN, Cherokee County
 A. I. GILKISON, Cheyenne County
 R. W. McCALL,⁷ Clark County
 F. M. PICKRELL,⁵ Clark County
 ROBT. E. CURTIS, Clay County
 CHAS. J. BOYLE, Cloud County
 J. H. McADAMS, Coffey County
 E. L. GARRETT, Comanche County
 W. L. TAYLOR,⁸ Crawford County
 F. H. DILLENBACK, Doniphan County
 R. O. SMITH, Douglas County
 CARL L. HOWARD, Ellis County
 CHAS. E. CASSEL, Finney County
 HARRY C. BAIRD, Ford County
 F. JOE ROBBINS, Franklin County
 H. J. ADAMS,⁹ Gray County
 CHAS. H. STINSON,¹⁰ Gray County
 F. J. PETERS, Greenwood County
 A. B. KIMBALL, Harvey County
 THEO. F. YOST, Hodgeman County
 E. H. LEKER, Jackson County
 JOE M. GOODWIN, Jefferson County
 W. W. HOUGHTON, Jewell County
 HARRY S. WILSON,¹ Johnson County
 CHESTER E. GRAVES,² Johnson County

H. L. HILDWEIN, Kingman County
 RAYMOND F. OLINGER, Labette County
 I. N. CHAPMAN, Leavenworth County
 CLELL A. NEWELL,¹¹ Lincoln County
 C. L. MCFADDEN, Lyon County
 V. M. EMMERT, McPherson County
 ARTHUR L. MYERS, Marion County
 O. T. BONNETT,¹⁵ Marshall County
 C. V. MALONEY, Meade County
 WM. H. BROOKS, Miami County
 HAYES M. COE, Montgomery County
 W. L. TAYLOR,³ Morris County
 PAUL B. GWIN,⁴ Morris County
 E. L. MCINTOSH, Nemaha County
 CHAS. D. THOMPSON, Neosho County
 J. M. DODRILL, Ness County
 H. S. WISE,¹² Osage County
 LOUIS H. ROCKFORD,¹³ Osage County
 R. P. SCHNACKE, Pawnee County
 V. S. CRIPPEN, Pratt County
 EDWIN I. MARIS, Rawlins County
 SAM J. SMITH, Reno County
 W. B. ADAIR,¹⁴ Rice County
 KYLE D. THOMPSON, Rooks County
 CARL CARLSON, Rush County
 E. J. MACY, Sedgwick County
 FRANK O. BLECHA, Shawnee County
 W. A. BOYS, Sumner County
 JOHN V. HEPLER, Washington County
 J. F. EGGERMAN, Wichita-Greeley Counties
 C. O. GRANDFIELD, Wilson County
 C. A. PATTERSON, Wyandotte County

County agent work in this state is provided for by the Federal Smith-Lever act and the state farm-bureau law. The Federal Smith-Lever act provides an appropriation which increases each year until 1922, which is distributed among the states according to their agricultural population. In addition to this it is supported from July 1, 1920, to July 1, 1921, by supplementary Federal agricultural appropriation, this being made necessary by the fact that this work increased more rapidly during the war period than could be financed by regular Smith-Lever funds. Before the Federal funds are available they must be duplicated within the state.

The state legislature appropriates at each session an amount equal to that available to this state from the Federal Smith-Lever appropriation. In addition to this, the state farm-bureau law, effective June 17, 1919,

* The U. S. Department of Agriculture coöperates in furnishing part of the salary of every member of this department. In the case of the county agents, counties, through farm bureaus, furnish a part of the salary and all expenses.

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|------------------------------|------------------------------|
| 1. Till Feb. 8, 1921. | 2. Beginning Feb. 9, 1921. |
| 3. Till Jan. 10, 1921. | 4. Beginning Feb. 1, 1921. |
| 5. Till Apr. 30, 1921. | 6. Beginning May 15, 1921. |
| 7. Beginning June 6, 1921. | 8. Beginning April 4, 1921. |
| 9. Till May 31, 1921. | 10. Beginning June 11, 1921. |
| 11. Beginning Apr. 15, 1921. | 12. Till May 14, 1921. |
| 13. Beginning May 15, 1921. | 14. Beginning Mar. 1, 1921. |
| 15. Till May 31, 1921. | |

provides that when one-fourth, or as many as 250 of the *bona fide* farmers of a county, shall form a farm-bureau organization, adopt a constitution and by-laws and elect officers, and when an equipment fund of at least \$800 has been provided and deposited in a local bank, the county commissioners shall appropriate at least \$1,200 per year (which sum may be raised by a special tax levy), and the Agricultural College shall appropriate at least \$1,200, so long as funds are available from the state or Federal funds above mentioned, for the purpose of hiring a county agent or agents and paying their expenses.

Previous to 1914, county agents were financed by membership dues and private subscriptions. At that time a membership of at least 100, paying dues of \$5 each, was required. In 1914, Congress passed the Smith-Lever act, and in 1915 the Kansas legislature passed a farm-bureau law which has since been the basis for the extension of the county agent work. January 1, 1916, there were ten counties with organized farm bureaus. This number has increased gradually until at the present time we have fifty-five active farm bureaus in the state.

COUNTY AGENTS. At the present time, January 1, 1921, the following fifty-five counties have farm bureaus with county agents actively at work: Allen, Anderson, Atchison, Barton, Bourbon, Chase, Cherokee, Cheyenne, Clark, Clay, Cloud, Coffey, Comanche, Doniphan, Douglas, Ellis, Franklin, Finney, Ford, Gray, Greenwood, Harvey, Hodgeman, Jackson, Jefferson, Jewell, Johnson, Kingman, Labette, Leavenworth, Lyon, Marion, Marshall, Meade, Miami, Montgomery, Morris, McPherson, Nemaha, Neosho, Ness, Osage, Pawnee, Pratt, Rawlins, Reno, Rooks, Rush, Sedgwick, Shawnee, Sumner, Washington, Wichita-Greeley, Wilson, and Wyandotte. The Wichita-Greeley farm bureau has a two-county county agent, as the farm-bureau law provides that west of the line which forms the boundary of Phillips and Norton counties two counties may unite in forming a farm bureau. The organization will be extended to ten new counties during the coming year.

The county agents are active in conducting demonstrations in the best methods of production, in assisting farmers with suggestions and plans relative to farm management and the farm business, and in organizing rural activities. The field demonstrations are conducted for the purpose of introducing new crops, and of testing relative values of varieties already grown, and methods of cultivation and harvesting. Demonstrations in proper methods of feeding, care and management of live stock are conducted. Methods of controlling insects and diseases of farm crops, orchards and gardens, and diseases of live stock are demonstrated. Surveys of the farm business are made, in order to study the conditions prevailing in typical areas and possible improvements in farm-management methods that should be employed. Improved methods of marketing and community welfare, in which better social relations are fostered, also are important features of this work. The county agent interests himself in practically every farm activity, especially where there is need of improvement.

A course suggesting special lines of training for those desiring to enter extension work will be found elsewhere in this catalogue.

FARM-MANAGEMENT DEMONSTRATIONS. Farm-management demonstrations are conducted by a farm-management specialist in coöperation with the county agents. In these demonstrations such records are taken as are essential to the determination of the net profits of the individual farms. These records are classified according to different types of farming, the profits of each type are determined, and individual farm records are compared with the average of all the farm records taken. The results of the study are made known to each farmer interested, in order that he may use the suggestions received in any need or reorganization of his own business. For those who desire it, farm account books are opened and instruction is briefly given in keeping simple records. This work was begun in September, 1914. The demand for this work was greatly increased by the enactment of the income-tax law, and the resulting need of business records by which the income might be determined, and by the demand for accurate cost-of-production figures by price-fixing commissions. The harvest labor problem is one of the largest activities of the farm-management demonstrator.

Home Economics

MRS. MARY WHITING MCFARLANE, Director

MISS RENA FAUBION, Specialist in Dairying

MISS MINNIE SEQUIST, Specialist in Clothing and Textiles

_____, Specialist in Dietetics

MISS W. PEARL MARTIN, Specialist in Home Nursing and Assistant in Institutes

MRS. HARRIET W. ALLARD, Specialist in Household Management and Assistant in Institutes

MISS SUSANNA SCHNEMAYER, Specialist in School Lunches and Assistant in Institutes

MRS. MOLLIE SMITH MOSER, Specialist in Nutrition (Temporary)

Instruction in home economics is secured by about 800 women annually at the Agricultural College, and there are many thousand others throughout the state who have had the advantages of resident instruction either in this or some other institution. Large as this number may seem, it is small when compared to the great number of women and girls of the state to whom these courses are not available. To give as much assistance as possible to this vast majority of women is the aim of the Department of Home Economics in Extension, and with this in view, seven women are regularly employed, and two others have been employed part time as special assistants during the year. The extension work in home economics is conducted through farm and home institutes, extension schools, special women's meetings, county normal institutes, home-makers' clubs, by judging at fairs, through lectures at chautauquas, and by means of personal correspondence. During the institute season, from October to March, four women spend full time in giving lectures and demonstrations before farm and home institutes and home-makers' clubs conducted in connection with them. From March to September, inclusive, the same specialists assist in women's meetings, in county normal institutes, and in judging at fairs, at chautauquas, and in special extension schools. From March to September all the specialists of this department give their time to intensive work upon the projects of which they are in charge.

EXTENSION SCHOOLS IN HOME ECONOMICS

Extension schools in home economics are held throughout the year as a means of carrying on the regular project work. These are of two types: those training a class, who agree in turn to pass on the instruction to others in their community; and those giving definite instruction to a class of individuals.

Special one-week schools in clothing problems are held upon request, followed by a week's laboratory course conducted by a skilled dressmaker.

Home Demonstration Work

MISS FRANCES L. BROWN,* State Home Demonstration Agent Leader
MISS ETHEL BREINER, Demonstration Agent, Anderson County
MISS ELLEN BATCHELOR, Demonstration Agent, Atchison County
MISS SARA JANE PATTON, Demonstration Agent, Cherokee County
MISS ETHEL McDONALD, Demonstration Agent, Meade County
_____, Demonstration Agent, McPherson County
_____, Demonstration Agent, Morris County
MISS IRENE TAYLOR, Demonstration Agent, Shawnee County
MISS MOLLIE LINDSEY, Demonstration Agent, Washington County

Home demonstration work was made possible in August, 1917, through the passage by Congress of the emergency extension bill. This bill provided funds for the employment of county and city home demonstration agents. This appropriation provided for the salaries of these agents, but the expenses and office room and equipment had to be provided by the county or city in which the home demonstration agent was placed. These expenses were met in this state in each case by a fund of \$400 guaranteed by the city or county at the time the services of a home demonstration agent were requested. These agents were called emergency home demonstration agents. Before the end of a year there were twenty-five of these agents in the state.

In the beginning the work was instituted in various ways and under different auspices, but after following this plan for a time it was found that it would be advantageous to defer the placing of a home demonstration agent until the counties were properly organized.

Since the state conference of home demonstration agents, which was held in August, 1918, such farm-bureau counties as have requested women agents have been organized on the basis of an ideal farm bureau. That is, the women are taken into the farm bureau as members, having all the rights and privileges accorded to any member, and they become a part of the working organization. In such counties the work of the home demonstration agent is taken up as a part of the regular farm-bureau program.

During the war the program of work of the home demonstration agent was furnished largely by the Federal Food Administrator and the needs of the times, but since that time the work has been organized upon a permanent basis and the program has been evolved through community, committee and mass meetings, each county making a program based upon the needs of the communities in the county. The home demonstration agent works to carry out this program.

* Resigned February 15, 1921.

Since July 1, 1919, the counties desiring a home demonstration agent must meet the following conditions:

1. They must supply an office properly equipped for the work.
2. Must supply adequate stenographic help.
3. They must set aside a fund, part of which shall be used to defray a part of the salary of the home demonstration agent, and \$500 of which is to be used as an expense fund. From this expense fund the home demonstration agent is reimbursed for the official use of her car and equipment and supplies are provided for her work.
4. There must be at least 100 women in the county having paid at least a \$1 membership fee in the county farm bureau. When these conditions have been met, the College, from state or Federal funds, appropriates an amount sufficient to complete the payment of the salary of the home demonstration agent, and selects a person who meets the requirements for the work.

When this is done this candidate appears before the board of the county desiring the home demonstration agent and enters into a contract with them to serve as their agent.

The work in the counties is now on a permanent basis and is met with appreciation and the same measure of success as has been accounted the county agent work.

Boys' and Girls' Club Work*

R. W. MORRISH, State Club Leader
ALENE HINN, Assistant
NEVELS PEARSON, Assistant
_____, Assistant

Boys' and girls' club work has become one of the very important phases of Agricultural College extension service. The club work is divided into club projects, and each project represents some specific farm or home activity, such as corn growing, pig feeding, gardening, canning, sewing, bread baking, etc.

Most of the clubs are conducted in coöperation with farm bureaus, farm and home institute organizations, county boards of education, and business men's organizations. Almost any community, however, can have a club by interesting five or more boys and girls in one of the club projects and by getting pledges from them to carry on the work as outlined by county and state leaders. Through these clubs the College is able to reach and serve a class of young people which it could neither reach nor serve in any other way. A large number of boys and girls get their first acquaintance with the College through the club work. Very few club groups fail to have a representative direct from the College visit them some time during the year. County agents give frequent and valuable help to these young workers. From College specialists, from county agents, and through special letters and lessons sent out from the state leader's office, the boys and girls learn definitely regard-

* Coöperative extension work in agriculture and home economics, Kansas State Agricultural College and U. S. Department of Agriculture, coöperating.

ing the results of many of the more important experiments conducted by the Experiment Station, and regarding farm practices recommended by the College. In fact, some of the most valuable methods and practices which the College has to offer are put into actual practice by these young people.

Complete records showing expenses and receipts are kept by the boys and girls, and they meet now and then with their local and county leaders to consider various matters pertaining to their different projects. The president of the club in most cases is one of the club's own members. In this way valuable experience in leadership is had by hundreds of boys and girls who have no other source for such experience. At the close of the club season the different club members send in their records and stories, and many of them exhibit at local, county and state contests. In short, the club boys and girls shoulder responsibilities, meet with failure as well as with success, and do on a small scale what they will be obliged to do on a larger scale when, in later years, they become real farmers and home-makers.

Drainage, Irrigation and Farm Engineering

H. B. WALKER, Drainage and Irrigation Engineer

IRA E. TAYLOR, Assistant Engineer (resigned, January 1, 1920)

_____, Farm Engineer

Reclamation by drainage and irrigation is an important factor in the development of the agricultural resources of Kansas. Eastern Kansas has its problems of flood control and land drainage, while in Western Kansas irrigation by pumping is each year more extensively practiced with uniform success. The Agricultural College maintains a Drainage and Irrigation Department to assist in the development of reclamation work. Competent engineers are employed to give practical help to persons or communities interested in field irrigation or land drainage. It is the duty of the department to render assistance in the organization and management of drainage districts; to give advice to farmers contemplating farm-drainage projects; to advise with individuals or communities interested in irrigation development; to prepare and approve plans, estimates and specifications, for drainage and irrigation projects; and to carry on a general campaign of education for the best methods of land reclamation.

Assistance with the planning of the farmstead and the farm buildings is now offered by this department. A number of farm building plans and specifications, with particular reference to Kansas conditions have been prepared. These plans are furnished any one interested, at the cost of blue-printing. It is the duty of the extension architect to give advice on the suitability of building materials; to make suggestions for the arrangement of the farmstead; to advise concerning the plans for the different farm buildings; and to carry on a general campaign of education for the best methods in farm building work.

The improvement of the farmstead involves many technical questions of an engineering nature. The modern farm is equipped with a water-supply system, a lighting plant, a sewerage system, up-to-date farm buildings, farm motors, and a farm workshop. The installation of this modern equipment is often simplified if proper technical advice is available. The Drainage and Irrigation Department has been enlarged to include farm engineering. It is the duty of the farm engineer to render engineering assistance to farmers in all matters relating to the development and modernization of the farmstead; to furnish plans and specifications for farm improvements; and to carry on a campaign of education for the best methods of farm engineering.

The services of the engineers of this department are free, except for the usual charge for traveling and local expenses.

Rural Service

———, Director

The work of the Rural Service Department is now on the project basis, approved by the States Relations Service of the United States Department of Agriculture, under the title "Rural Organization."

The object of this department is to advise with and assist county agents and farm bureaus in coördinating the activities of groups of farmers, community leaders and farmers' organizations for more effective work in the development of the agriculture and home economics of the rural community.

Conferences of leaders are held in local communities for discussion and consultation in regard to the work undertaken by organized groups, and to ways in which the efforts of these groups may be coördinated. Suggestions are given by letter and personal visit to individuals and groups contemplating organization, as to what type of organization is best suited to local needs. Where communities lack unity, because of a multitude of unrelated and overlapping organizations, efforts are made through personal visits and correspondence to interest the organizations in coördinating their activities through the farm bureau.

Programs for all-round community development in harmony with county farm-bureau plans are worked out on the request of community leaders in coöperation with other specialists on the extension staff. One state-wide rural organization conference is conducted each year. At this conference methods of rural organization and community programs are given consideration.

Home-Study Service

(Correspondence.)

V. L. STRICKLAND, Director
GEORGE GEMMEL, Agronomy
FRANK H. GULICK, Animal Husbandry
HELEN W. FORD, Home Economics
FLOYD PATISON, Industrial Economics
RETA DIELMANN, History and Civics
_____, English
P. P. BRAINARD, Education

NOTE.—The Faculty members employed in the Home-study Service devote their entire time to the work of teaching by correspondence. They keep in close touch with the various departments of the College, and all credit courses which are offered by correspondence must first meet the requirements of the regular College department handling the courses in residence.

There are many people in Kansas who, for many reasons, cannot attend classes on the campus, although they have interest in and need for the work offered by the Kansas State Agricultural College. Moreover, it has quite generally come to be recognized that even the completion of a college course does not end the necessity for education. It is in recognition of these manifold demands, far greater in number than the resident attendance at the College, that the institution offers to citizens of the state an opportunity to study at home various lines of agriculture, home economics, mechanic arts, farm engineering, and numerous high-school subjects.

The Home Study Service attempts to meet the widely varying needs and conditions of the people of Kansas by offering the following types of service:

1. *Free Reading or Unit Courses*, each of which is a one-lesson treatment in a simple, brief, and nontechnical way, of a single problem or unit of subject matter for which there is a demand in some phase of practical everyday life. The courses in this list are so numerous and varied that few interests are not touched by them. That they may be readily available and freely used by all to whom they would be helpful, they are made free to residents of the state. For full information concerning Free Reading Courses, send for Part I of the Home-study Service Announcement.

2. *Extension or Vocational Courses*, which are complete, comprehensive courses adapted to the needs of those who are ambitious for thorough, scientific training to meet in an effective way the various practical and technical problems found in the various vocational activities. These afford the nearest possible home equivalent of a college education, and offer the particular advantage of utilizing the practical situations of life as their laboratory and shop exercises. For full information concerning the Vocational Courses, send for Part II of the Home-study Service Announcement.

3. *Credit Courses*, which are offered for those who for any reason are unable to attend school and wish to do work of a type that can be used for college or high-school credit. These courses are also of value to those who wish to use their time to advantage when school is not in session. For further information concerning Credit Courses, send for Part III of the Home-study Service Announcement.

4. *Special Courses for Teachers*, which are a series designed as helps for teachers of industrial, agricultural and home-economics subjects. A particular effort is made in these courses to make available to the teachers of the state all the materials and aids which the Kansas State Agricultural College can offer them.

5. *Emergency Courses*. During the war a number of these courses were offered to help meet the new difficulties and duties imposed. It is the purpose of the department to continue a service of this kind. Whenever new situations arise calling for such courses, requests for them will be appreciated.

6. *Study Centers*. Under regulations established for this purpose, study centers may be arranged where college subjects may be studied under the personal direction of members of the College Faculty.

7. *Information Service*, the purpose of which is to afford a definite source to which technical or informational questions may be referred. All such questions which are referred to the Home-study Service will be promptly answered if possible, or referred to a specialist in the College or elsewhere, who will supply the information desired.

8. *Lantern-slide Service*. A number of sets of lantern slides on agricultural, industrial and home economics subjects have been prepared by specialists in the College with particular reference to Kansas conditions. These will be loaned, free of cost (except transportation charges), to any responsible resident of Kansas. For further information concerning these, inquiries should be addressed to the Home-study Service of the College.

VOCATIONAL COURSES

SUBJECTS COVERED. Vocational courses treat subjects covered in the three general fields, *Agriculture*, *Industry* and *Home Economics*. The list which follows is being revised from time to time according to demands.

BY WHOM CONDUCTED. The courses are prepared and taught by specialists in correspondence study, who keep in close touch with the College Faculty in their respective fields.

METHODS OF WORK. Each course is based upon a recognized standard text treating the subjects, and is covered in a number of definite lessons, ranging from ten to twenty. A written report is required of the student on each lesson, according to instructions sent upon enrollment.

EXAMINATIONS. Examinations in courses completed may be taken at the College or locally under the direction of some suitable person with which arrangements can be made, such as a county superintendent or city superintendent.

FEES. The enrollment fee for a single vocational course is \$3 (\$6 to nonresidents of Kansas).

BOOKS AND STATIONERY. Students will be expected to provide all textbooks, drawing instruments, stationery and other materials required in their courses, and to pay postage on the lessons sent in.

AGRICULTURE

- | | |
|---|-------------------------------|
| EA 1. Essentials of Agriculture. | EA 16. Greenhouse Management. |
| EA 2. Elementary Agriculture Chemistry. | EA 17. Floriculture. |
| EA 3. Soils. | EA 18. Landscape Gardening. |
| EA 4. Cereal Crop. | EA 19. Farm Forestry. |
| EA 5. Forage Crops. | EA 21. Dairy Manufacturing. |
| EA 6. Gardening. | EA 24. Horse Production. |
| EA 7. Orchardring. | EA 25. Dry-land Farming. |
| EA 8. Feeds and Feeding. | EA 26. Beef Production. |
| EA 9. Animal Breeding. | EA 27. Pork Production. |
| EA 10. Types and Classes of Live Stock. | EA 28. Sheep Raising. |
| EA 11. Farm Dairying. | EA 30. Beekeeping. |
| EA 12. Poultry Production. | EA 31. Farm Management. |
| EA 13. Economic Entomology. | |

HOME ECONOMICS

- | | |
|------------------------------|---|
| EH 1. Household Management. | EH 11. Home Decoration. |
| EH 2. Foods and Cookery I. | EH 12. Personal Hygiene. |
| EH 3. Foods and Cookery II. | EH 13. Household Bacteriology. |
| EH 5. Sewing. | EH 14. Child Life and Care of Children. |
| EH 6. Textiles. | EH 15. Household Chemistry. |
| EH 7. Elementary Needlework. | EH 16. Costume Design. |
| EH 8. Millinery. | EH 17. Laundering. |
| EH 9. Home Nursing. | |

INDUSTRIAL SUBJECTS

- | | |
|--|---|
| EI 1. Shop Mathematics. | EI 16. Roads and Pavements. |
| EI 2. Mechanical Drawing, Applied. | EI 17. Automobiles. |
| EI 3. Architectural Drawing. | EI 18. Machine Shop Work. |
| EI 4. Constructive Carpentry and Inside Finishing. | EI 19. Bridge and Culvert Construction. |
| EI 5. Heating and Ventilating. | EI 20. Elementary Woodworking. |
| EI 6. Farm Drainage. | EI 21. Farm Woodworking. |
| EI 7. Farm Buildings. | EI 22. Foundry Practice. |
| EI 8. Concrete Construction. | EI 23. Gasoline and Oil Traction Engines. |
| EI 9. Farm Blacksmithing. | EI 24. Pattern Making. |
| EI 10. Farm Machinery. | EI 25. Plumbing. |
| EI 11. Steam Boilers and Engines. | EI 26. Practical Electricity. |
| EI 12. Gasoline Engines. | EI 27. Sheet Metal Drafting. |
| EI 13. Blacksmithing. | EI 28. Strength of Materials. |
| EI 14. Plane Surveying. | EI 29. Steam Traction Engines. |
| EI 15. Highway Construction. | EI 30. Structural Engineering I. |

CREDIT COURSES

GRADES OF WORK. Credit courses are offered in both high-school, or entrance-credit subjects, and college subjects. The courses in each case are the full equivalent of resident courses in like subjects.

BY WHOM CONDUCTED. The courses are prepared under the supervision of the heads of departments of the Agricultural College Faculty, and are taught by specialists in correspondence study under the same regulations that govern resident work.

EXAMINATION. Examinations may be taken at the College or under conditions approved by the College. In the latter case, arrangements can often be made with the local county superintendent, or city superintendent of schools, to conduct the examination.

REGULATIONS. 1. Enrollments for correspondence-study work will be received at any time during the year, and students may continue their work uninterrupted throughout the entire year.

2. Correspondence students will be expected to complete any course for which they are enrolled within twelve months from the date of enrollment.

3. Not more than two courses are advised by correspondence at any one time. It is recommended that a student carry but one subject at a time, particularly where only part of the time is given to the work.

4. Each subject listed under the various departments constitutes what is known as a correspondence "course."

5. Students enrolling for correspondence courses must meet the prerequisites the same as if undertaking the work in residence.

6. A student may not be enrolled for correspondence work while in attendance at any institution of learning without special permission from the Dean or proper authorities in the institution of which he is a student.

FEES. An enrollment fee of \$10 is charged for residents of Kansas; \$15 for nonresidents. For this amount the student is entitled to eight semester hours of college work, or three semester credits of high-school work, and is given a year in which to finish them. No fee is refunded because of the student's inability to enter upon the course for which once registered. Extensions of time can be granted only where the work has been delayed because of personal illness of the student. All such cases must be taken up individually with the director of this department.

BOOKS AND STATIONERY. Students will be expected to provide all textbooks, drawing outfits, stationery and other materials required in their courses, also to pay postage on lessons one way.

FOR WHOM INTENDED. Though credit courses offered by the Home-study Service are still limited, the number is steadily growing, and it is the purpose of the department to add courses whenever a demand for them becomes evident. The other types of work are sufficiently broad to be of value to a great variety of people. The following classes in particular should be able to profit by them:

1. Those who have completed a common-school course, but for any reason are unable to attend high school.

2. High-school graduates temporarily or permanently unable to attend college.

3. Students whose attendance at high school or college has been interrupted.

4. Students who for any reason have fallen behind in their work and wish to use their spare time catching up.

5. The strong, aggressive student who does not wish to halt his progress for vacations and other interruptions.

6. High-school and grade classes in practical courses that need supplementing and enrichment.

7. Teachers who wish further professional or other training, or who need help in planning and conducting their work.

8. Professional and business men who wish to keep growing along some line of interest, professional or avocational.

9. Clubs and other organizations which wish to make systematic studies.

10. Men and women who wish effective help in meeting the demands in their vocations for technical and scientific knowledge and training.

COURSES OF INSTRUCTION

The list of Credit Courses offered is being extended constantly, the new courses added in each case being those for which there seems to be the most demand. The following is the present list:

High-school Courses

| | Number of assignments | Unit H. S. credit |
|--|-----------------------|-------------------|
| AGRICULTURE | | |
| PCA 1. Elementary Agriculture I | 20 | $\frac{1}{2}$ |
| PCA 2. Elementary Agriculture II | 20 | $\frac{1}{2}$ |
| DRAWING | | |
| PCD 3. Shop Mechanical Drawing I..... | 18 | $\frac{1}{2}$ |
| PCD 4. Shop Mechanical Drawing II..... | 18 | $\frac{1}{2}$ |
| ENGLISH | | |
| PCE 1. Grammar and Composition (first year)..... | 20 | $\frac{1}{2}$ |
| PCE 2. Literature (first year) | 20 | $\frac{1}{2}$ |
| PCE 3. Composition (second year) | 20 | $\frac{1}{2}$ |
| PCE 4. Literature (second year) | 20 | $\frac{1}{2}$ |
| PCE 5. Composition (third year) | 20 | $\frac{1}{2}$ |
| PCE 6. Literature (third year) | 20 | $\frac{1}{2}$ |
| HISTORY | | |
| PCH-A. Ancient History | 20 | $\frac{1}{2}$ |
| PCH 3. Medieval History | 20 | $\frac{1}{2}$ |
| PCH 4 A. Modern History I | 20 | $\frac{1}{2}$ |
| PCH 4 B. Modern History II | 20 | $\frac{1}{2}$ |
| PCH 5. American History I | 20 | $\frac{1}{2}$ |
| PCH 6. American History II | 20 | $\frac{1}{2}$ |
| MATHEMATICS | | |
| PCM 1. Algebra I | 20 | $\frac{1}{2}$ |
| PCM 2. Algebra II | 20 | $\frac{1}{2}$ |
| PCM 3. Algebra III | 20 | $\frac{1}{2}$ |
| PCM 5. Plane Geometry I | 20 | $\frac{1}{2}$ |
| PCM 5. Plane Geometry II | 20 | $\frac{1}{2}$ |
| PCM 6. Solid Geometry | 20 | $\frac{1}{2}$ |
| PCM 7. Bookkeeping | 20 | $\frac{1}{2}$ |
| SCIENCE | | |
| PCS 1. Physical Geography | 20 | $\frac{1}{2}$ |
| *PCS 2. Botany | 20 | $\frac{1}{2}$ |
| *PCS 3. Chemistry I | 20 | $\frac{1}{2}$ |
| *PCS 4. Chemistry II | 20 | $\frac{1}{2}$ |

* In preparation.

College Credit Courses

DIVISION OF AGRICULTURE

| | <i>Semester credits.</i> | <i>Assign- ments.</i> |
|--|------------------------------|---------------------------|
| AGRICULTURAL ECONOMICS | | |
| CEc 2. Agricultural Economics | 3 | 24 |
| AGRONOMY | | |
| CA 3. Grain Crop Production | 2 | 16 |
| CA 4. Forage Crop Production | 2 | 16 |
| ANIMAL HUSBANDRY | | |
| CL 1. Types and Classes of Live Stock..... | 1 | 8 |
| CL 2. History of Breeds | 2 | 16 |
| CL 3. Principles of Feeding | 3 | 24 |
| CL 4.* Pork Production | 2 | 16 |
| HORTICULTURE | | |
| CH 1. Orchardng | 2 | 16 |
| CH 2. Gardening | 2 | 16 |
| CH 3. Floriculture | 2 | 16 |
| CH 4. Greenhouse Construction and Management | 3 | 24 |
| CH 5. Landscape Gardening | 1 | 8 |
| CF 1. Farm Forestry | 3 | 24 |
| POULTRY HUSBANDRY | | |
| CPP 1. Farm Poultry Production | 1 | 8 |

DIVISION OF ENGINEERING

| | | |
|---|---|----|
| APPLIED MECHANICS | | |
| CE 5. Concrete Construction | 1 | 8 |
| CE 2. Mechanical Drawing I | 2 | 16 |
| CE 6. Mechanical Drawing II | 3 | 24 |
| CE 4. Kinematics | 3 | 24 |
| CIVIL ENGINEERING | | |
| CE 1. Highway Engineering I | 2 | 16 |
| SHOP PRACTICE | | |
| CE 7. Metallurgy | 2 | 16 |
| STEAM AND GAS ENGINEERING | | |
| CE 3. Farm Motors | 2 | 16 |
| CE 8. Heating and Ventilation A..... | 2 | 16 |
| CE 9. Airplane Mechanics | 1 | 18 |
| CE 10. Elements of Steam and Gas Power Engineering..... | 3 | 24 |

DIVISION OF HOME ECONOMICS

| | | |
|--|---|----|
| CLOTHING AND TEXTILES | | |
| CHE 1. Textiles | 2 | 16 |
| FOOD ECONOMICS AND NUTRITION | | |
| CHE 2. Foods Study | 1 | 8 |
| HOUSEHOLD ECONOMICS | | |
| CHE 3. Sanitation and Public Health..... | 3 | 24 |

DIVISION OF GENERAL SCIENCE

| | | |
|-----------------------------|---|----|
| ECONOMICS AND SOCIOLOGY | | |
| CEc 1. Economics | 3 | 24 |
| CS 2. Rural Sociology | 3 | 24 |
| CS 3. Sociology | 3 | 24 |

* In preparation.

| | EDUCATION (PROFESSIONAL) | Semester credits. | Assign- ments. |
|--------------------|----------------------------------|----------------------|-------------------|
| CP 1. | Industrial Education | 3 | 24 |
| CP 2. | Educational Psychology | 3 | 24 |
| CP 3.* | Educational Sociology | 3 | 24 |
| CP 4. | History of Education | 3 | 24 |
| CP 5. | Principles of Education | 3 | 24 |
| CP 6. | Methods of Teaching | 3 | 24 |
| CP 7. | Educational Administration | 3 | 24 |
| CP 8. | Psychology | 3 | 24 |
| CP 9. | School Discipline | 2 | 16 |
| CP 10. | Rural Education | 3 | 24 |
| CP 11. | Agricultural Education | 2 | 16 |
| CP 12. | Home Economics Education | 2 | 16 |
| CP 13. | Rural Organization | 2 | 16 |
| ENGLISH | | | |
| CCE 1. | College Rhetoric I | 3 | 24 |
| CCE 2. | College Rhetoric II | 3 | 24 |
| CCE 3. | Business English | 3 | 24 |
| CCE 4. | The Short Story | 3 | 24 |
| CCE 5. | American Literature | 2 | 16 |
| GEOLOGY | | | |
| CG 1. | Dynamic Geology | 2 | 16 |
| HISTORY AND CIVICS | | | |
| CHC 1.* | Community Civics | 3 | 24 |
| CHC 2.* | Modern Europe I | 3 | 24 |
| MATHEMATICS | | | |
| CM 7. | Plane Trigonometry | 3 | 25 |

* In preparation.

Student Organizations

THE STUDENTS' SELF-GOVERNING ASSOCIATION

The Students' Self-governing Association was organized on broad lines in the spring of 1919, with the whole-hearted approval and sanction of the Faculty. The association was formed "for the purpose of placing the control and advancement of student interests and activities in the hands of the student body itself, with the firm belief that this arrangement will cause an increased self-control, resulting in higher ideals and better coöperation, and that officers of sufficient wisdom and maturity may be found so that appeal to College authorities shall be unnecessary."

All students enrolled under any department of the College are eligible for membership. The annual membership fee is 50 cents. Special dues to include admission to student activities may be voted by the association.

The officers of the association are a president and a vice president, elected by the association as a whole, and a secretary and a treasurer, elected by the executive council of the association.

The supreme governing council of the Student Association is known as the executive council. This body consists of nineteen members, and its membership is made up as follows: The president and the vice president of the association; two members from each of the College classes; two from the Literary Society Council; one from the Women's Pan-Hellenic Council; one from the Men's Pan-Hellenic Council; one from the "K" fraternity; one from the Women's Athletic Association; one from the Y. W. C. A. cabinet; one from the Y. M. C. A. cabinet; and one from the School of Agriculture. Regular meetings of the council are held once a month.

There are standing committees on discipline, finance, social affairs, calendar, school spirit, and points, and other temporary or standing committees may be provided for from time to time as occasion demands. All chairmen of committees are appointed by the executive council. Each chairman submits a list of members desired for his committee, which appointments must be ratified by the executive committee before they become effective.

All regulations passed by the executive council, by committees, and by the entire association, are considered valid and binding upon all students in so far as said actions are not disapproved by the Faculty and the President of the College.

The Students' Self-governing Association is the successor of the Student Council, a representative body which was organized in 1909, received official sanction from the Faculty of the College and from the Board of Administration, and functioned successfully until replaced by the Students' Self-governing Association and its executive council. The Student Council consisted of four members elected from the senior class,

three from the junior, two from the sophomore, and one from the freshman class. In addition, the School of Agriculture elected a delegate, who, however, had no vote. At each meeting of the council a member of the Faculty was privileged to be present and to participate in the discussions.

THE CHRISTIAN ASSOCIATIONS

The Young Men's Christian Association and the Young Women's Christian Association are organizations of the greatest worth and value in the College community, forming centers of moral culture and religious stimulus among the young men and women during their developmental period. As is well known, the Christian associations in colleges stand for the best ideals among the students, and are always accorded the cordial support of the authorities. In addition to general moral and spiritual development, the College Christian associations are of practical and efficient influence among the students in many directions.

THE YOUNG MEN'S CHRISTIAN ASSOCIATION

The College Y. M. C. A. has always been a strong and influential body among the students. Its growth may be indicated by the fact that the organization was able in 1908 to erect a handsome building for its purposes at a cost of \$35,000, on the corner of Eleventh and Fremont streets, near the College grounds.

This building contains reading rooms, committee rooms, students' living rooms, gymnasium, etc. All young men are welcome to make use of the privileges of the building, whether members or not. No fixed fees for membership are charged, each member giving whatever he feels able to afford. One of the useful and practical features of the Y. M. C. A. is a students' employment bureau, which is maintained for the benefit of all students seeking employment. The religious work of the organization includes various courses for the study of the Bible and the work of Christian missions, which are maintained through the winter. The regular religious meetings of the association occur on Thursday evenings from 6:45 to 7:30, while occasional Sunday afternoon meetings are also held. Special meetings and receptions, which serve to broaden the acquaintanceship of the students and promote good-fellowship, are arranged from time to time. Especial attention is given the new students on and after their arrival, and assistance is rendered in securing rooms and boarding places for them. The association maintains a regular secretary, with whom prospective students are cordially encouraged to correspond. Address General Secretary, Y. M. C. A., Kansas State Agricultural College, Manhattan, Kan.

THE YOUNG WOMEN'S CHRISTIAN ASSOCIATION

Similar in aim and purpose to the organization of the young men is the Young Women's Christian Association. The Home Economics Hall is the headquarters of the association, to which all young women of the College are at all times cordially welcome. An office for the general secretary and rest rooms for the young women are maintained in this building during the College year.

An employment bureau for women students is maintained by the general secretary, without charge to its beneficiaries. Various committees are responsible for the lines of work of the association. At the opening of the College semesters the incoming trains are met by "Big Sisters," who assist new women students, the "Little Sisters," in securing suitable lodging and boarding places. If any prospective woman student will write to the general secretary of the association, her "Big Sister" will correspond with her during the summer vacation.

During the College year various social functions are held for the young women. The first of these is an informal reception to enable the College girls to become acquainted with one another. Once each year the two associations entertain jointly.

The religious life of the young women is fostered by the weekly vesper services in the Home Economics Hall. The different churches of the city extend a cordial welcome to the College women, and through the efforts of the association they are encouraged to active participation in the services of the church of their choice.

THE NEWMAN CLUB

The Newman Club, an organization of Catholic students, holds meetings devoted to religious study on alternate Sundays. This work is carried on under the local pastor. The College authorities recognize this Bible study by allowing a two-hour credit for it when duly certified. In further recognition of the club's efforts the College has placed a set of the Catholic Encyclopedia in the library, where there is also a comprehensive selection of Catholic books and pamphlets purchased by the club. In addition to the meetings devoted to religious study, social meetings are held.

The club is affiliated with the national organization of Newman clubs of the state universities and colleges. Its aim is to foster sound morality, to develop character, and to promote the knowledge and practice of their faith among Catholic students.

THE HENRY SCATTERGOOD FRIENDLY GROUP

The Henry Scattergood Friendly Group, an organization of the Society of Friends young people, holds its regular meeting Sunday afternoons during the College year, and considers the problems confronting the student in his religious and civil life. It aims to find in Christian association a broader spiritual service in College life.

To prospective students, the group offers a cordial welcome.

LITERARY AND SCIENTIFIC SOCIETIES

The literary societies of the College, eight in number, are wholly student organizations, holding weekly meetings in the College buildings. The Alpha Beta and Franklin literary societies are open to both sexes; the Ionian, Eurodelphian and Browning societies admit only young women to membership; the Webster, Hamilton and Athenian societies admit young men only. Students are encouraged to join one of these organizations for the sake of practice in the use of language, training in debate, and general experience in conducting meetings and in dealing

with their fellows. These societies jointly maintain a debating council, which coöperates with a Faculty committee in arranging for all inter-collegiate and interstate debates participated in by representatives of the College. The oratorical board, similarly maintained by these societies, arranges for the intersociety oratorical contest.

In the School of Agriculture there are two literary societies; one for young men, the Lincoln, and one for young women, the Philomathian. These societies have the same general aims and purposes as those in the College.

AGRICULTURAL SOCIETIES

The Block and Bridle Club meets on the first and third Mondays of each month. Membership is open to all animal husbandry students above the freshman year. The object of the club is to promote the interests of animal husbandry in the College and in the state. Live-stock problems of all kinds are taken up, and members of the Faculty and outside speakers are secured for addresses on special topics.

The Agricultural Association meets Monday evenings. All students interested in agriculture are eligible to membership. The object of the association is to promote the general interests of agriculture in the College and in the state.

The Klod and Kernel Klub meets on the second and fourth Tuesdays of each month. Membership is open to junior and senior agronomy students and members of the agronomy Faculty. The object of the society is to arouse more interest in agronomic work and to help students and Faculty members of the Department of Agronomy to become better acquainted. Faculty and outside speakers are secured for programs.

ENGINEERING SOCIETIES

The various technical societies of the Division of Engineering meet weekly in departmental seminars for lectures, presentation of papers, and discussion of notable articles appearing in the technical press or in the journals of the national societies. On special occasions all of the societies meet together as the Engineer's Association, for lectures by eminent practicing engineers.

The students in mechanical and electrical engineering are organized as student branches of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers, respectively.

The purpose of these various societies is to acquaint the students with the latest development in the fields of engineering and architecture, to give them more definite ideas as to the opportunities in their professions and the requirements for success in their profession, to promote acquaintance and fellowship among the students, and to further the interest of the Division of Engineering in the College and the state.

THE COLLEGE BAND

The College Band is a military organization, composed of cadets assigned to this duty for the College year in lieu of drill and technical military instruction. The Band is limited in its membership, and attendance of the members upon its exercises is obligatory. It has proved an effective aid to the cadet corps, stimulating a love for martial music, and affording an attractive feature of the various public ceremonial occasions at the College.

THE COLLEGE ORCHESTRA

The Orchestra is a student organization connected with the Department of Music, membership in which is voluntary. Its daily training under competent leadership results in the acquisition of a considerable repertoire of musical compositions of the best quality. Those connected with the Orchestra obtain in this way familiarity with the works of many of the great composers, and among the students at large the Orchestra is an efficient aid in cultivating a taste for and an appreciation of good music.

ATHLETIC ORGANIZATIONS

By means of the gymnasium the College is prepared to give complete physical as well as mental training. This building, which is equipped with all the usual accessories, assists in developing and maintaining physical tone and health in the student body. In addition to the gymnasium classes, and physical training in the military corps of cadets, all young men are encouraged to develop their physical skill by playing on practice teams in various athletic lines. In the fall football teams are organized; in the fall and winter, basket ball; while in the spring baseball, tennis, and track athletics prevail. Every possible encouragement is given all students desirous of participating in these games to enter the practice teams and receive the necessary instruction. The most proficient of these have opportunity to enter the first teams and participate in intercollegiate contests. The College authorities encourage all reasonable and sane athletic development, as a means for the training of physical qualities desirable in men everywhere. Professionalizing tendencies are strictly repressed, and the athletic rules adopted by the Faculty prevent, by proper regulation, all participation in intercollegiate games on the part of students deficient in their studies.

The women students have equal opportunity with young men for general physical training. In the gymnasium, under a physical director, they receive training suitable for their needs. Basket-ball and tennis teams are organized among the young women.

HONORARY ORGANIZATIONS

The honorary organizations of the College consist of fraternities, sororities, and societies. Membership in these organizations is based on scholarship and achievement. They seek to stimulate effort and to promote the interests of the various divisions or departments which they serve or represent. The list of organizations follows:

| <i>Organization</i> | <i>Division or department</i> |
|----------------------------------|-------------------------------|
| Alpha Zeta | Agriculture |
| A. I. E. E. | Electrical Engineering |
| Alpha Psi | Veterinary Medicine |
| A. S. M. E. | Mechanical Engineers |
| Block and Bridle | Animal Husbandry |
| Forum | Debating |
| "K" Fraternity | Athletics |
| Klod and Kernel Klub | Agronomy |
| McDowell Club | Music |
| Omicron Nu | Home Economics |
| Phi Mu Alpha | Music |
| Pi Kappa Delta | Debating |
| Purple Masque | Dramatics |
| Quill Club | College Writers |
| Scabbard and Blade | Military |
| Sigma Delta Chi | Industrial Journalism |
| Sigma Tau | Engineering |
| Society of Civil Engineers | Civil Engineering |
| Theta Chi Gamma | General Science |
| Theta Sigma Phi | Industrial Journalism |
| Zeta Kappa Psi | Debating |

In addition to these student organizations there are a chapter of Phi Kappa Phi, to which students of the highest scholarship in all divisions of the College are elected, and a chapter of Gamma Sigma Delta, which draws its membership from agronomy seniors whose scholarship is outstanding. In both these societies election is in the hands of Faculty members. (See "Honor Societies.")

School of Agriculture

(The Secondary School)

A. P. DAVIDSON, *Principal*

The School of Agriculture is organized to meet the needs of young men and young women of Kansas who may need instruction more closely identified with the life of the farm, home and shop than that provided by the high schools of the state. It is also intended to meet the needs of those men and women who find themselves for any cause unable to complete an extensive course of collegiate instruction, yet who feel the necessity of a practical training for their activities in life. A large part of the student's time in the School will be spent in the laboratories and in contact with the real objects of his future work. An element of culture and general information is provided for in several semesters of English for each course and in work in history, economics, citizenship, physics, and chemistry.

The School of Agriculture is not a school preparatory to the College. Its sole purpose is to fit men and women for life in the open country, and to make country life more attractive; to make the workshop more efficient; in short, to dignify and to improve industrial life. It is not established to entice students away from the high school. It is for those of every walk in life who wish a larger view and greater skill in doing the world's work.

All the resources of the College are at the disposal of the School of Agriculture. Its students have every advantage possessed by students in the College.

All the general regulations of the College apply to the School of Agriculture.

THE COURSE OF STUDY

The curriculum in agriculture emphasizes the growing of crops and the raising of live stock. A minimum of theory and a maximum of practical work bring the student into close contact with the actual conditions of farm life.

The curriculum in home economics emphasizes the care of the home. Home decoration, home sanitation, cookery, and sewing receive careful attention.

The curriculum in mechanic arts leads to a trade. It is designed to shorten the time of apprenticeship and to prepare the way for skilled workmanship in shop or factory. The great amount of time spent in the shops should easily lead to skill and efficiency in subsequent work.

ADMISSION. Students who are fourteen years of age or older, and who have completed the eighth grade of the public schools, are admitted without examination. Students who have not completed the eighth grade are examined in arithmetic, United States history, English grammar, geography, reading, and spelling. Students who have done work in the public

high schools receive credit for work done. Maturity in years and practical experience are given due consideration, but students should not consider these qualifications alone sufficient to admit them. Whenever there is a question about a student's qualifications for entering, he should correspond with the principal of the School of Agriculture before coming.

The principal of the School of Agriculture is charged with the execution of all College and Faculty rules relating to the enrollment of students in classes and their choice of studies. Students entering under the age of nineteen years are required to complete one of the three-year curricula as outlined before they choose work not included in the curriculum.

It is greatly to the advantage of the prospective student to see to it that his certificate showing work done in grammar school or high school be sent to the College as soon as possible after his work done there is finished. A permit to register will then be sent him by the registrar in advance of his coming in September; this will greatly facilitate the work of entrance. The student will present this permit at the registration room in Nichols Gymnasium, and will not be compelled to wait his turn to meet the committee on admission.

Upon registration each student receives a certificate of his standing, which he presents to the principal of the School, who is charged with the duty of enrolling students in classes, selecting and arranging subjects, and assigning hours.

GRADES AND FAILURES. Examinations are held at stated periods and at such other times as the Faculty may provide. Absence from examination, or ten or more unexcused absences from class periods, severs a student's connection with the institution, which connection can be renewed only through the action of the principal of the School. Any withdrawals from school or class must be authorized by the principal; otherwise, continued absence is construed as failure. Parents or guardians are furnished a copy of the record of the student's work at the close of any term, if they so desire.

Curriculum in Agriculture

(SCHOOL OF AGRICULTURE)

The Arabic numeral immediately following the name of subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

| FIRST SEMESTER | SECOND SEMESTER |
|--|--|
| Stock Judging I An. Husb. 51..... 3(0-6) | Stock Judging II An. Husb. 52..... 3(0-6) or |
| Industrial Arithmetic A Math. 51 4(4-0) | Algebra I Math. 63 4(4-0) |
| English I Engl. 51 4(4-0) | English II Engl. 54 4(4-0) |
| Beginning Poultry Poult. Husb. 51..... 2(1-2) | Breeds and Breeding An. Husb. 53..... 2(2-0) |
| Carpentry I Shop 51 2(0-4) | Farm Gas Engines I Farm Engr. 75..... 2(1-2) |
| Elementary Botany Bot. 51 3(2-2) | Fruit Growing Hort. 51 3(2-2) |
| | Farm Insects Ent. 62 3(2-2) |
| Physical Training M-I Phys. Ed. 51A..... 1(0-3) | Physical Training M-II Phys. Ed. 52..... 1(0-3) |
| Music* | Music* |

SECOND YEAR

FIRST SEMESTER

| | |
|--|-----------|
| Farm Crops | |
| Agron. 51 | 5(4-2) |
| Elementary Chemistry | |
| Chem. 51 | 4(3-2) |
| English III | |
| Engl. 61 | 4(4-0) |
| Dairying | |
| Dairy Husb. 61..... | 2(1-2) |
| Physical Training M-I | |
| Phys. Ed. 51A..... | 1(0-3) or |
| Military Science I† | |
| Mil. Tr. 101 | 1(0-4) |
| Music* | |
| <i>Elective, 4 credits from the following:</i> | |
| Feeds and Feeding | |
| An. Husb. 54..... | 2(2-0) |
| Elementary Dairy Judging | |
| Dairy Husb. 63..... | 1(0-3) |
| Algebra I or II | |
| Math. 63 or 64..... | 4(4-0) |
| Elementary Traction Engines I | |
| Farm Engr. 66..... | 2(0-4) |
| Blacksmithing I | |
| Shop 69 | 2(0-4) |
| Elementary Farm Machinery | |
| Farm Engr. 51..... | 2(1-2) |

SECOND SEMESTER

| | |
|--|-----------|
| Soils and Fertilizers | |
| Agron. 56 | 3(2-2) |
| Elementary Agricultural Chemistry | |
| Chem. 53 | 4(3-2) |
| English IV | |
| Engl. 64 | 4(4-0) |
| Live-stock Production | |
| An. Husb. 55..... | 3(3-0) |
| Physical Training M-II | |
| Phys. Ed. 52 | 1(0-3) or |
| Military Science II† | |
| Mil. Tr. 102 | 1(0-4) |
| Music* | |
| <i>Elective, 4 credits from the following:</i> | |
| Elementary Zoölogy | |
| Zoöl. 51 | 3(1-4) |
| Carpentry V | |
| Shop 64 | 3(0-6) |
| Algebra I or II | |
| Math. 63 or 64..... | 4(4-0) |
| Farm Gas Engines II | |
| Farm Engr. 77..... | 3(0-6) |
| Blacksmithing II | |
| Shop 72 | 2(0-4) |
| Concrete Construction I | |
| Ap. Mech. 51, 55..... | 2(1-2) |

THIRD YEAR

FIRST SEMESTER

| | |
|--|-----------|
| Elementary Farm Management | |
| Ag. Ec. 51..... | 3(2-2) |
| Physics A-I | |
| Physics 51 | 4(3-2) |
| English V | |
| Engl. 72 | 4(4-0) |
| American Nation I | |
| Hist. 59 | 4(4-0) |
| Physical Training M-I | |
| Phys. Ed. 51A..... | 1(0-3) or |
| Military Science I† | |
| Mil. Tr. 101..... | 1(0-4) |
| Music* | |
| <i>Elective, 5 credits from the following:</i> | |
| Plane Geometry I | |
| Math. 66 | 4(4-0) |
| Diseases of Farm Animals | |
| Surg. 51 | 2(2-0) |
| Elementary Grain Marketing | |
| Mill. Ind. 52..... | 3(2-2) |
| El. Farm Sanitation and Water Supply | |
| Farm Engr. 73..... | 2(2-0) |
| Weed Control and Seed Identification | |
| Agron. 58 | 2(0-4) |
| Automechanics I | |
| Shop 95 | 3(1-4) |

SECOND SEMESTER

| | |
|--|-----------|
| Elementary Agricultural Economics | |
| Ag. Ec. 56..... | 3(3-0) |
| Physics A-II | |
| Physics 52 | 4(3-2) |
| Civics | |
| Hist. 63 | 4(4-0) or |
| American Nation II | |
| Hist. 60 | 4(4-0) |
| Farm Writing | |
| Ind. Jour. 51 | 4(2-4) |
| Physical Training M-II | |
| Phys. Ed. 52..... | 1(0-3) or |
| Military Science II† | |
| Mil. Tr. 102..... | 1(0-4) |
| Music* | |
| <i>Elective, 5 credits from the following:</i> | |
| Plane Geometry II | |
| Math. 67 | 4(4-0) |
| Physiology and Hygiene | |
| Anat. 51 | 4(4-0) |
| Incubation Practice | |
| Poult. Husb. 55..... | 1(-) |
| Elementary Bacteriology | |
| Bact. 52 | 3(2-2) |
| Brooding Practice | |
| Poult. Husb. 58..... | 1(-) |
| Elementary Traction Engines II | |
| Farm Engr. 69..... | 2(0-4) |
| Elementary Beekeeping | |
| Ent. 65 | 3(2-3) |

* Elective.

† All male students are required to take Physical Training during the first year of their attendance and Military Training during the next year.

Curriculum in Mechanic Arts

(SCHOOL OF AGRICULTURE)

The Arabic numeral immediately following the name of subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

FIRST SEMESTER

| | |
|-----------------------------|--------|
| English I | |
| Engl. 51 | 4(4-0) |
| Algebra I | |
| Math. 63 | 4(4-0) |
| Freehand and Object Drawing | |
| Arch. 52 | 2(0-4) |
| Farm Gas Engines I | |
| Farm Engr. 75 | 2(1-2) |
| Elementary Botany | |
| Bot. 51 | 3(2-2) |
| Blacksmithing I | |
| Shop 69 | 2(0-4) |
| Physical Training M-I | |
| Phys. Ed. 51A | 1(0-3) |
| Music* | |

SECOND SEMESTER

| | |
|-----------------------------------|--------|
| English II | |
| Engl. 54 | 4(4-0) |
| Algebra II | |
| Math. 64 | 4(4-0) |
| Elementary Mechanical Drawing | |
| Ap. Mech. 73 | 2(0-4) |
| Elementary Traction Engineering I | |
| Farm Engr. 66 | 2(0-4) |
| Carpentry I | |
| Shop 51 | 2(0-4) |
| Concrete Construction I | |
| Ap. Mech. 51, 55 | 2(1-2) |
| Blacksmithing II | |
| Shops 72 | 2(0-4) |
| Physical Training M-II | |
| Phys. Ed. 52 | 1(0-3) |
| Music* | |

SECOND YEAR

FIRST SEMESTER

| | |
|---|--------|
| English III | |
| Engl. 61 | 4(4-0) |
| Plane Geometry I | |
| Math. 66 | 4(4-0) |
| Physics A-I | |
| Physics 51 | 4(3-2) |
| Shop Drawing I | |
| Ap. Mech. 80 | 2(0-4) |
| Machine Shop I | |
| Shop 88 | 2(0-4) |
| Military Science I† | |
| Mil. Tr. 101 | 1(0-4) |
| Physical Training M-I | |
| Phys. Ed. 51A | 1(0-3) |
| <i>Elective</i> , 3 credits from following: | |
| Carpentry II | |
| Shops 54 | 3(0-6) |
| Automechanics I | |
| Shop 95 | 3(1-4) |
| Farm Gas Engines II | |
| Farm Engr. 77 | 3(0-6) |

SECOND SEMESTER

| | |
|---|-----------|
| English IV | |
| Engl. 64 | 4(4-0) |
| Plane Geometry II | |
| Math. 67 | 4(4-0) |
| Physics A-II | |
| Physics 52 | 4(3-2) |
| Shop Drawing II | |
| Ap. Mech. 90 | 2(0-4) |
| Military Science II† | |
| Mil. Tr. 102 | 1(0-4) or |
| Physical Training M-II | |
| Phys. Ed. 52 | 1(0-3) |
| <i>Elective</i> , 5 credits from following: | |
| Carpentry III | |
| Shop 57 | 3(0-6) |
| Automechanics II | |
| Shop 97 | 3(1-4) |
| Machine Shop II | |
| Shop 90 | 2(0-4) |
| Elementary Traction Engines II | |
| Farm Engr. 69 | 2(0-4) |

* Elective.

† All male students are required to take Physical Training during the first year of their attendance and Military Training during the next year.

THIRD YEAR

FIRST SEMESTER

| | |
|--|------------------|
| Modern History I † | |
| Hist. 55 | 4(4-0) |
| Solid Geometry | |
| Math. 71 | 4(4-0) |
| Civics | |
| Hist. 63 | 4(4-0) |
| English V | |
| Engl. 72 | 4(4-0) |
| Military Science I ‡ | |
| Mil. Tr. 101 | 1(0-4) <i>or</i> |
| Physical Training M-I | |
| Phys. Ed. 51A | 1(0-3) |
| <i>Elective, 3 credits from following:</i> | |
| Carpentry IV | |
| Shop 60 | 2(0-4) |
| Farm Gas Engines III | |
| Farm Engr. 80 | 3(0-6) |
| Shop Drawing III | |
| Ap. Mech. 96 | 3(0-6) |

SECOND SEMESTER

| | |
|--|------------------|
| Modern History II † | |
| Hist. 56 | 4(4-0) |
| Algebra III | |
| Math. 72 | 4(4-0) |
| Economics | |
| Econ. 52 | 4(4-0) |
| English VI | |
| Engl. 74 | 4(4-0) |
| Military Science II ‡ | |
| Mil. Tr. 102 | 1(0-4) <i>or</i> |
| Physical Training M-II | |
| Phys. Ed. 52 | 1(0-3) |
| <i>Elective, 3 credits from following:</i> | |
| Machine Shop III | |
| Shop 93 | 3(0-6) |
| Carpentry V | |
| Shop 64 | 3(0-6) |
| Elementary Traction Engines III | |
| Farm Engr. 72 | 2(0-4) |

Curriculum in Home Economics

(SCHOOL OF AGRICULTURE)

The Arabic numeral immediately following the name of subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

FIRST SEMESTER

| | |
|-------------------------|--------|
| Elementary Food Study I | |
| Food and Nut. 55..... | 3(1-4) |
| Garment Making I | |
| Clo. and Text. 57..... | 3(1-4) |
| General Science | |
| Bot. 52 | 4(2-4) |
| English I | |
| Engl. 51 | 4(4-0) |
| Industrial Arithmetic W | |
| Math. 52 | 4(4-0) |
| Physical Training W-I | |
| Phys. Ed. 75A..... | 1(0-3) |
| Music* | |

SECOND SEMESTER

| | |
|--------------------------|------------------|
| Elementary Food Study II | |
| Food and Nut. 56..... | 3(1-4) |
| Garment Making II | |
| Clo. and Text. 58..... | 3(1-4) |
| Elementary Design | |
| Ap. Art 51 | 3(0-6) |
| English II | |
| Engl. 54 | 4(4-0) |
| Algebra I | |
| Math. 63 | 4(4-0) <i>or</i> |
| Gardening | |
| Hort. 56 | 2(1-2) |
| Carpentry H | |
| Shop 66 | 2(0-4) |
| Physical Training W-II | |
| Phys. Ed. 76..... | 1(0-3) |
| Music* | |

† Ancient History I and II or American Nation I and II may be substituted for Modern History I and II.

‡ All male students are required to take Physical Training during the first year of their attendance and Military Science during the next year.

SECOND YEAR

FIRST SEMESTER

| | |
|--------------------------------|--------|
| Food Problems I | |
| Food and Nut. 57..... | 2(0-4) |
| Clothing Problems and Design | |
| Clo. and Text. 59..... | 4(2-4) |
| Elementary Chemistry | |
| Chem. 51 | 4(3-2) |
| English III | |
| Engl. 61 | 4(4-0) |
| Elements of Poultry Keeping | |
| Poult. Husb. 53 | 1(1-0) |
| Economics | |
| Econ. 52 | 4(4-0) |
| Physical Training W-I or W-III | |
| Phys. Ed. 75A or 77.... | 1(0-3) |
| Music* | |

SECOND SEMESTER

| | |
|--------------------------------|--------|
| Food Problems II | |
| Food and Nut. 58..... | 4(2-4) |
| Home Management | |
| Hshld. Econ. 63..... | 3(2-2) |
| Elementary Household Chemistry | |
| Chem. 52 | 4(3-2) |
| English IV | |
| Engl. 64 | 4(4-0) |
| Civics | |
| Hist. 63 | 4(4-0) |
| Physical Training W-II or W-IV | |
| Phys. Ed. 76 or 78.... | 1(0-3) |
| Music* | |

THIRD YEAR

FIRST SEMESTER

| | |
|--------------------------------|-----------|
| Home Sanitation | |
| Hshld. Econ. 64 | 3(2-2) |
| Dressmaking and Millinery | |
| Clo. and Text. 60..... | 3(0-6) |
| Physiology and Hygiene | |
| Anat. 51 | 4(4-0) or |
| Physics H-I | |
| Physics 61 | 4(3-2) |
| English V | |
| Engl. 72 | 4(4-0) |
| Ancient History I† | |
| Hist. 51 | 4(4-0) |
| Physical Training W-I or W-III | |
| Phys. Ed. 75A or 77.... | 1(0-3) |
| Music* | |

SECOND SEMESTER

| | |
|--------------------------------|-----------|
| House Planning and Furnishing | |
| Ap. Art. 56 | 4(1-6) |
| Child Care and Home Nursing | |
| Hshld. Econ. 65 | 3(2-2) |
| Elementary Bacteriology | |
| Bact. 52 | 3(2-2) or |
| Physics H-II | |
| Physics 62 | 4(3-2) |
| English VI | |
| Engl. 74 | 4(4-0) |
| Ancient History II† | |
| Hist. 52 | 4(4-0) |
| Physical Training W-II or W-IV | |
| Phys. Ed. 76 or 78.... | 1(0-3) |
| Music* | |

Agricultural Courses

AGRICULTURAL ECONOMICS

51. ELEMENTARY FARM MANAGEMENT. Third year, first semester. Class work, two hours; laboratory, two hours. Three semester credits. Prerequisites: Farm Crops, Soils and Fertilizers, and Live-stock Production. Assistant Professor Davidson.

The economics factors affecting the organization and operation of the farm business are studied with respect to their effect on the profits from farming enterprise. Crop rotations for Kansas and their effect upon soil productivity receive considerable attention. The advantage of keeping a simple and practical system of accounts is discussed and students are given actual practice work in keeping a system of accounts. Legal papers with which the farmer should have a working knowledge, such as deeds, mortgages, leases and negotiable instruments, receive consideration. Results from actual farms are studied in the laboratory to give the student opportunity to observe the effects of the various economic factors in their influence on the farm business.

56. ELEMENTARY AGRICULTURAL ECONOMICS. Third year, second semester. Class work, three hours. Three semester credits. Prerequisites: Agron. 51 and 56; An. Husb. 55. Mr. Morris.

* Elective.

† American Nation I and II or Modern History I and II may be substituted for the corresponding terms of Ancient History.

The course presents the more important principles pertaining to the business side of farming. Farm organization, the characteristics of the factors of production and the intensity culture are followed by a study of farm tenancy, the forces determining the value of agricultural products, and the problems of marketing. Finally profits of farmers in relation to their efficiency and their ability to purchase land are discussed. The course is conducted by lectures, texts, and supplementary reading. Texts: Taylor's *Agricultural Economics*; and Ely and Wicker's *Elementary Principles of Economics*.

AGRONOMY

51. FARM CROPS. Second year, first semester. Class work, four hours; laboratory, two hours. Five semester credits. Prerequisite: Elementary Botany. Assistant Professor Davidson.

The course involves a study of both grain and forage crops, approximately one-half semester being given to each. Emphasis is placed upon the economic production of those crops which are of greatest importance in Kansas. The laboratory work is planned to acquaint the student with the different grain and forage plants and their habits of growing. Text: Wilson and Warburton's *Field Crops*.

56. SOILS AND FERTILIZERS. Second year, second semester. Class work, two hours; laboratory, two hours. Three semester credits. Prerequisites: Elementary Chemistry; Farm Crops. Assistant Professor Davidson.

The course involves a study of the physical nature of soils and their adaptation to crops, together with proper methods of handling to maintain good physical condition, to conserve moisture and to prevent washing and blowing. Means of maintaining the fertility of the soil, the care and use of barnyard manure; green manure and commercial fertilizers are also considered. In the laboratory and on field trips different soils are studied with reference to their physical properties and their relation to crops and methods of management. Text: Whitson and Walster's *Soils and Fertilizers*.

58. WEED CONTROL AND SEED IDENTIFICATION. Third year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Farm Crops. Mrs. Harling.

This course deals with the control and eradication of weeds; the identification of weed plants and seeds; and germination and purity testing. Field trips are made, and the assembling of a herbarium of the common farm weeds is required.

ANIMAL HUSBANDRY

51. STOCK JUDGING I. First year, first semester. Laboratory, six hours. Three semester credits. Assistant Professor Aubel.

This course consists in score-card practice in judging horses, beef cattle, dairy cattle, sheep, and swine. By means of this practice the students become familiar with the general points to be observed in judging market types and classes of live stock. One-fourth of this time is given to the study of dairy cattle, which instruction is given in the Department of Dairy Husbandry. Text: Craig's *Judging Live Stock*.

52. STOCK JUDGING II. First year, second semester. Laboratory, six hours. Three semester credits. Mr. Horlacher.

This course consists of a study of the breeding types and classes of horses, cattle, sheep, and swine, with practice in scoring and judging breeding animals.

53. BREEDS AND BREEDING. First year, second semester. Class work, two hours. Two semester credits. Prerequisite: Stock Judging I. Assistant Professor Aubel.

This course consists of a study of pure-bred horses, cattle, sheep, and swine, and the methods practiced by the best breeders. It also embraces the study of the general principles of breeding, such as variation and heredity. Text: Mumford's *Breeding of Farm Animals*.

54. FEEDS AND FEEDING. Second year, first semester. Class work, two hours. Two semester credits. Associate Professor Paterson.

This course consists of a comparative study of the various feeds as to their usefulness and their relation to successful and economical feeding of live stock. It involves a study of the digestive system and the processes of nutrition, and a study of the origin, nature, grades, and value of the various by-products that are used in feeding operations. Text: Henry and Morrison's *Feeds and Feeding*, abridged edition.

55. LIVE-STOCK PRODUCTION. Second year, second semester. Class work, three hours. Three semester credits. Prerequisites: Stock Judging I and II. Associate Professor Paterson.

This course involves a study of successful and economical methods of growing and finishing cattle, sheep, and hogs for market purposes, as well as the breeding of both market and pure-bred animals. Lectures, supplemented by agricultural newspaper work and Experiment Station records.

DAIRY HUSBANDRY

61. DAIRYING. Second year, first semester. Lecture, one hour; laboratory, two hours. Two semester credits. Mr. Becker.

This course includes lectures on the various breeds of dairy cattle, milk and its composition, Babcock testing, separation, and churning. Two individual lectures are given to the agricultural students on feeding the dairy herd, and two additional lectures on cheese making to the home-economics students.

Laboratory.—The laboratory work comprises the operation of the Babcock test, separating milk, churning, and soft-cheese making.

62. STOCK JUDGING I. (An. Husb. 51.) Associate Professor Cave.

Four weeks are given over to the judging of dairy cattle. The rest of the course is devoted to the study of the breeding and market types of horses, cattle, sheep, and swine, and is presented by the Department of Animal Husbandry.

63. ELEMENTARY DAIRY JUDGING. Second year, first semester. Laboratory, three hours. One semester credit. This course cannot be taken without Dairying (course 61). Associate Professor Cave, Mr. Becker.

This course calls for the judging of dairy stock from the standpoint of economical production and breed type. Score cards are used for the purpose of training the student to become accurate, thorough, and systematic in the selection of animals as representative of breeds or for breeding purposes. No textbook is required. *Types and Breeds of Farm Animals*, by C. S. Plumb, and Breeders' Association Literature are used for reference.

HORTICULTURE

51. FRUIT GROWING. First year, second semester. Class work, two hours; laboratory, two hours. Three semester credits. Mr. Pickett.

This course consists of a study of some of the problems of the fruit grower. Orchard soils, choice of varieties, planting, care of orchards, insects and diseases, and methods of their control; cultivation, harvesting, and the propagation of fruit plants, are some of the most important topics studied.

Laboratory.—Actual work is given in pruning, spraying, and the study of orchard conditions, examination of orchard soils, and the propagation of fruit plants.

56. GARDENING. First year, second semester. Class work, one hour; laboratory, two hours. Two semester credits. Mr. Balch.

The practices and principles involved in the planning, cultivation, and care of the home or kitchen gardens are here studied.

MILLING INDUSTRY

52. ELEMENTARY GRAIN MARKETING. Third year, first semester. Class work, two hours; laboratory, two hours. Three semester credits. Professor Fitz.

This course includes the study of methods of handling and storing grain, together with the marketing of surplus grain from the farm. It involves study of the method of selling or buying, shipping and grading grain; organization of grain-inspection departments, with their merits and defects; the principle grain markets, with receipts and shipments of grain. The laboratory work consists of practice in sampling bulk grain and in examining and grading different kinds and types of such grain. A brief study is also made of the by-products resulting from the manufacture of food products and their comparative costs.

POULTRY HUSBANDRY

51. BEGINNING POULTRY. First year, first semester. Class work, one hour; laboratory, two hours. Two semester credits. Mr. Fox.

This course takes up a discussion of the various operations that go to make up the art of poultry keeping.

Laboratory.—The laboratory study includes work in dressing, packing, and caponizing.

53. ELEMENTS OF POULTRY KEEPING. Third year, first semester. Classwork, one hour. One semester credit. Professor Lippincott and Mr. Fox.

This course covers the same ground as Beginning Poultry, except that no laboratory work is required.

55. INCUBATION PRACTICE. Third year, second semester. Three times a day, seven days a week, for a period of not less than four weeks, at hours outside the regular schedule. One semester credit. Prerequisite: Beginning Poultry.

This course consists of the care of an incubator by the student through the incubation period, testing the eggs, and bringing off the hatch. Careful records of fertility, cost of incubation, and varying temperature, moisture, and ventilation conditions are kept. One successful hatch must be brought off in either a hot-air or hot-water incubator.

58. BROODING PRACTICE. Third year, second semester. Three times a day, seven days a week, for a period of not less than four weeks, at hours outside the regular schedule. One semester credit. Prerequisite: Beginning Poultry. To be preceded or accompanied by Incubation Practice.

In this course each student handles a flock of chicks. He has the entire care of brooding and feeding them during the most critical weeks. A record of the cost of fuel and feed, of gains in weight, and of mortality is required. A group of at least fifty chicks must be successfully brooded for at least four weeks in any of the several types of brooders.

Veterinary Medicine and Physiology Courses

ANATOMY AND PHYSIOLOGY

51. **PHYSIOLOGY AND HYGIENE.** Third year, second semester. Class work, four hours. Four semester credits. Doctor Vawter, Scott.

Sufficient consideration is given to the anatomy or structure of the body to enable the student to understand more fully the functions of the proper parts. The normal functions of the various organs of the body are studied. The importance of the normal functioning of the body for the prevention of diseases, and also diseases that may arise from improper performance of the various organs, are discussed. Text: Ritchie's *Sanitation and Physiology*.

SURGERY AND MEDICINE

51. **DISEASES OF FARM ANIMALS.** Third year, second semester. Class work, two hours. Two semester credits. Doctor Frick.

This course is intended to teach the student the recognition of disease, the principles involved in the preservation of health, and the application of first aid in disease or accident of farm animals. The various diseases resulting from the use of spoiled foods, or the improper or injudicious use of good foods, are discussed. The value of food, care, and the nursing of the sick animal is thoroughly impressed upon the student. The common infectious diseases and the means of their prevention and eradication are considered. Text: Craig's *Common Diseases of Farm Animals*.

General Science Courses

BACTERIOLOGY

52. **ELEMENTARY BACTERIOLOGY.** Third year, second semester. Lectures, two hours; laboratory, two hours. Three semester credits. Prerequisite: Chemistry, one year. Mr. Baker.

This is an elementary course in the principles of bacteriology. Bacteriological problems are considered from an entirely practical standpoint. The course is offered in order to give the student a reading knowledge of the sources and modes of infection; the relation of bacteriology to dairying and to soils and crop production; general sanitation; fermentations, etc. It includes a discussion of microörganisms as related to air, water, and foods.

Laboratory.—Various microscopic forms of importance in fermentation; preservation and spoilage of foods; the influence of various preservatives upon microörganisms common in the home; methods of sterilization and of pasteurization; the handling of infectious material; normal and abnormal fermentations of milk and milk products; quantitative study of bacteria in the soil; a limited study of pathogenic bacteria, of sewage pollution of water, etc., comprise the laboratory work.

BOTANY

51. **ELEMENTARY BOTANY.** First year, first semester. Class work, two hours; laboratory, two hours. Three semester credits. Miss Cashen.

This course involves an elementary study of the biology of plants, including the simpler facts of their structure and of their physiology. The life history of a seed plant is followed from the germination of the seed to maturity; and the structure and work of the root, stem, and leaf system are studied in some detail. The biology of the flower and its peculiar

adaptations to insect or wind pollination are emphasized, as well as the manner in which seeds and fruits are distributed. Throughout the course emphasis is laid on the relations of plants to light, air, water, and soil, and on the relation of the biology of the plants to agricultural practice.

52. GENERAL SCIENCE. First year, first semester. Recitation, two hours; laboratory, four hours. Four semester credits. Miss Trail.

This course deals with problems of elementary science as related to home-economics work. The major part of the work is a study of plants such as molds, bacteria, plant tissues, and the storage of foods in plants. Some time is given to a study of physical and chemical problems of an elementary nature. The problems studied are chosen because of their relation to the work of the household.

CHEMISTRY

51. ELEMENTARY CHEMISTRY. Second year, first semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Mr. Skourup.

The work this term is an elementary study of the general principles of chemistry, using the elements oxygen, hydrogen, nitrogen, chlorine, and carbon, and their most important compounds, as its basis. Sulphur and phosphorus, and to a slight extent other nonmetals, are studied, and following this a study of the metals and their most important compounds is begun. So far as possible, illustrations are drawn from practical life on the farm and in the home. The laboratory work is designed to give the student some knowledge of the essential features of chemical change, as well as to familiarize him with some of the more important elements and chemical compounds. Textbook: McPherson and Henderson's *First Course in Chemistry*.

52. ELEMENTARY HOUSEHOLD CHEMISTRY. Second year, second semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Prerequisite: Elementary Chemistry. Mr. Skourup.

In the work of this term the study of the metals is completed, and chemistry is then studied in its more direct application to the household. The course includes not only some special applications of inorganic chemistry, but simple organic chemistry, especially in its relation to foods. The laboratory work is an application of chemistry to various household problems touching water, foods, textiles, and utensils. Textbook: Snyder's *Chemistry of Plant and Animal Life*.

53. ELEMENTARY AGRICULTURAL CHEMISTRY. Second year, second semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Prerequisite: Elementary Chemistry. Mr. Skourup.

The study of the metals, begun the previous semester, is first completed. The chemical composition and chemistry of the growth of plants and animals are then taken up, and the general principles of chemistry are presented as applicable on the farm in relation to soils, fertilizers, dairy products, feeds, water, etc. The laboratory work follows these lines and is made as practical as possible. Textbook: Snyder's *Chemistry of Plant and Animal Life*.

ECONOMICS

52. ECONOMICS. Second or third year, both semesters. Class work, four hours. Four semester credits. Professor Burr.

This course is a study of fundamental principles underlying man's wealth-getting and wealth-using activities, and their application to conditions and problems of the industries of to-day. Instruction is based on a text, assigned readings, and reports.

ENGLISH

51. ENGLISH I. First year, first semester. Class work, four hours. Four semester credits. Associate Professor Rice and Miss Fuller.

This course has a twofold purpose: to develop in the student the ability to interpret readily from the printed page, and to give instruction in the elementary principles of composition. For the first aim, short selections from the readers are used, with readings from textbooks, biographies, current periodicals, and works of a vocational nature. In connection with the text, practice work in letter writing and business forms is emphasized. Texts: Searson and Martin, *Studies*, Advanced Course; Hanson, *Two Years' Course in English Composition*.

54. ENGLISH II. First year, second semester. Class work, four hours. Four semester credits. Miss Fuller.

This course is a continuation of English I. It includes a review of grammar, practice in the use of the dictionary, and a thorough study of the paragraph. Oral composition is required. Emphasis is placed on the writing of themes on topics of keenest interest to the student. Text: Hanson, *Two Years' Course in English Composition*, chapters IX-XIII, inclusive.

61. ENGLISH III. Second year, first semester. Class work, four hours. Four semester credits. Associate Professor Rice and Miss Fuller.

The work of this course consists of a study of American literature. Class readings, class discussions, written sketches, abstracts, and outlines are required. The aim of the course is to familiarize the student with the masterpieces of his own countrymen, and to offer continued study in the cultural as well as the practical side of literature and language. Text: Cairns, *American Literature for Secondary Schools*, to page 147.

64. ENGLISH IV. Second year, second semester. Class work, four hours. Four credits. Assistant Professor Russel and Miss Fuller.

This course is a continuation of the work in English III, completing the work of the text. Selections from the works of Poe, Webster, Lincoln, Longfellow, Whittier, Emerson, Lowell, Holmes and others are chosen for study, and some written work is required. Text: Cairns, *American Literature for Secondary Schools*, page 147 to end.

71. ENGLISH V. Third year, first semester. Class work, four hours. Four semester credits. Assistant Professor Russel and Miss Fuller.

This is a course in advanced composition. It includes instruction in the four forms of discourse, practice in the preparation of original themes, oral English, elementary debating, and a continuation of first-year work in commercial usage. Texts: Hanson, *Two Years' Course in English Composition*, Part III; Davis and Lingham, *Business English and Correspondence*.

74. ENGLISH VI. Third year, second semester. Class work, four hours. Four semester credits. Associate Professor Rice and Miss Fuller.

This is a course in English classics. It includes an intensive study of representative classics. Abstracts, outlines, paraphrases, and original themes are required. Texts: Selections from the works of Shakspeare, Scott, Burns, Tennyson, and others.

ENTOMOLOGY

61. FARM INSECTS. First year, second semester. Class work, two hours; laboratory, two hours. Three semester credits. Associate Entomologist McColloch.

This is a study of the elementary anatomy, structure, and physiology of insects, complete enough to give clear understanding of the general

structure of insects and the underlying facts upon which the scientific application of remedial or preventive measures is based. All of the more important insects of the farm, garden, and orchard are discussed at sufficient length to give a clear idea of their life histories and habits, together with the best means of control. The class work consists of lectures and text.

Laboratory.—The laboratory work is designed to acquaint the student with the more common injurious insects found on the farm. The preparation and use of various sprays, poisons, baits, and fumigants are also taken up.

65. ELEMENTARY BEEKEEPING. Third year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Farm Insects. Associate Professor Merrill.

This course comprises a general study of the structure, life history, general behavior, activities, and products of the honeybee. Special attention is given to practical beekeeping. A study is made of bee diseases and of the standard methods to be used in their eradication and control.

HISTORY AND CIVICS

51, 52. ANCIENT HISTORY I AND II. Third year, first and second semesters, respectively. Class work, four hours. Four semester credits for each course. Miss Orem.

Beginning with a study of civilization in the Nile and Tigris-Euphrates valleys, the first semester's work includes a study of Greece and Rome to the time of the Roman empire. The second semester's work takes up the fall of Rome, the medieval period, and the dawning of the new age up to the seventeenth century. In addition to the greater political events, special attention is given to the institutional life of this period, to the social, economic, and intellectual forces at work in the different states, as well as to the development of their governmental organization. Text: Robinson and Breasted's *Ancient and Medieval History*.

55, 56. MODERN HISTORY I AND II. Third year, first and second semesters, respectively. Class work, four hours. Four semester credits for each course. Miss Orem.

This consists of the development of Europe from the seventeenth century to the present time. In view of the fact that greater changes have taken place in Europe since 1789 than in the thousand years preceding, special attention is given to the social and economic developments of this period. The development of the nations into world powers and their relations with the Americas and the Far East is emphasized; also the changes which prepared the way for the Great War and the resulting European situation. Text: *Outlines of European History*. Part II, Robinson and Beard.

59, 60. AMERICAN NATION I AND II. Third year, first and second semesters, respectively. Class work, four hours. Four semester credits for each course. Miss Orem.

This course consists of a survey of American history from the discovery of America to the present time. It deals with the establishment of the English colonies in America; the growth of social and political institutions in these colonies; the development of an American nationality; the struggle among European nations for the possession of North America; the causes and meaning of the American Revolution; the formation and establishment of the constitution; the rise of the West and its influence, socially, politically, and economically; the growth of sectionalism, the secession movement and the struggle to preserve the Union; and the important events characterizing American history since the termination of the contest between the North and the South. Along with the political history of the United States, a study of its economic development is made

for the purpose of understanding the steps by which America, from humble beginnings in the colonial period, has reached its present high position as an industrial state. Texts: West's *History of the American People*, and Bogart's *The Economic History of the United States*.

63. CIVICS. Second and third years, both semesters. Class work, four hours. Four semester credits. Miss Orem.

This is not a course of the old type, usually called civil government, nor a course in constitutional law, but a vigorous course in the actual workings of our present-day governmental and political activities. Text: Guiteau's *Government and Politics in the United States*, Kansas edition.

INDUSTRIAL JOURNALISM AND PRINTING

51. FARM WRITING. Third year, second semester. Class work, two hours; laboratory, four hours. Four semester credits. Associate Professor Rogers.

The course treats of the elementary principles of writing for newspapers and farm publications, on such subjects as the students are likely to encounter in practical life. The student is shown how to obtain effective publicity for worthy enterprises in which he may be engaged. Emphasis is laid on agriculture, rural life, and general community service.

MATHEMATICS

51. INDUSTRIAL ARITHMETIC A. First year, first semester. Class work, four hours. Four semester credits. Miss Holroyd and Miss McKittrick.

The course has two distinct aims: (1) A practical knowledge of the principles of numbers, both integral and fractional; and (2) the application of these principles to practical problems of the farm and shop. A large number of problems arising from actual experience over the whole field of agricultural science are made the basis of the problem work. Farm investments, farm accounts, and farm values receive special attention. Text: Stratton and Remick's *Agricultural Arithmetic*.

52. INDUSTRIAL ARITHMETIC W. First year, first semester. Class work, four hours. Four semester credits. Miss Holroyd and Miss McKittrick.

This course follows the lines of Industrial Arithmetic A, except that the points of emphasis are varied so as to meet the needs of young women. Text: Same as for the course above.

63. ALGEBRA I. First year, both semesters. Class work, four hours. Four semester credits. Miss Holroyd and Miss McKittrick.

This course includes a study of simple algebraic expressions and the use of the equation; a treatment of the methods of finding distances by means of scale drawings, similar triangles, and elementary trigonometric functions; a discussion of the various uses of graphs and of positive and negative numbers. Text: Wells and Hart's *New High-school Algebra*.

64. ALGEBRA II. First and second years, both semesters. Class work, four hours. Four semester credits. Prerequisite: Algebra I. Miss Holroyd and Miss McKittrick.

The chief topics considered are solution of simultaneous equations, both graphically and algebraically, factoring, fractions and fractional equations, square roots, radicals, and an introduction to quadratic equations. Text: Wells and Hart's *New High-school Algebra*.

66. PLANE GEOMETRY I. Second and third years, first semester. Class work, four hours. Four semester credits. Prerequisite: Algebra II. Miss Holroyd and Miss Hyde.

Books I and II of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course.

67. PLANE GEOMETRY II. Second and third years, second semester. Class work, four hours. Four semester credits. Prerequisite: Plane Geometry I. Miss Hyde and Mr. Lewis.

Books III, IV, and V of Wentworth and Smith's *Plane and Solid Geometry* are included in this course.

71. SOLID GEOMETRY. Third year, first semester. Class work, four hours. Four semester credits. Prerequisite: Plane Geometry II. Miss Holroyd, Miss McKittrick, and Mr. Lewis.

Books VI, VII, and VIII of Wentworth and Smith's *Plane and Solid Geometry* form the subject matter of this course.

72. ALGEBRA III. Third year, second semester. Class work, four hours. Four semester credits. Prerequisite: Algebra II. Miss Holroyd, Miss McKittrick, and Miss Hyde.

This course includes, besides a rapid review of factoring, fractions, linear equations, roots, radicals, and exponents, a treatment of quadratic forms with graphical work and theory, ratio and proportion, variation, the progressions, and the binomial theorem for positive integral exponents. Text: Wells and Hart's *Second Course in Algebra*.

MILITARY TRAINING

All young men are required to take military training during their second year of attendance in the School of Agriculture. Their work in this branch is identical, so far as it goes, as that of the men in the College corps of cadets. The following work is taken:

101. MILITARY SCIENCE I. Lectures, recitations, and military drill, four hours a week. One semester credit.

The work of this course is divided as follows:

(a) *Practical*. Physical drill; infantry drill; school of the soldier, squad and company in close and extended order; preliminary instruction, sighting, position, and aiming drills, gallery practice, nomenclature, and care of rifle and equipment.

(b) *Theoretical*. Theory of target practice; individual and collective; military organization; map reading; service of security; personal hygiene.

102. MILITARY SCIENCE II. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: Military Science I.

The work of this course is divided as follows:

(a) *Practical*. Physical drill; infantry drill; school of the battalion; ceremonies; manuals; bayonet combat; entrenchment; first-aid instruction; range and gallery practice.

(b) *Theoretical*. Lectures on military policy as shown by military history of the United States, and military obligation of citizenship; service of information; combat; Infantry Drill Regulations, to include the school of the company; camp sanitation for small commands.

MUSIC

Music is offered as an elective for both young women and young men. Instruction is furnished free to all regular students assigned to music classes, but for individual instruction a fee is charged. Further particulars are given in the article on "Music," elsewhere in this catalogue.

PHYSICAL EDUCATION

MEN'S DEPARTMENT

51A. PHYSICAL TRAINING M-I. First semester. Two hours. One semester credit. Required of all young men during their first semester in the school.

The course includes elementary free-hand calisthenics; elementary light hand apparatus, including wands, dumb-bells, etc.; elementary heavy apparatus work, and games. All work is graded in progressive order for each semester. Swimming is taught in the spring. A physical examination is made of each student when he enters. During the fall rugby football and soccer football are given. From the first of December to the end of the semester the work is in the gymnasium. Elementary calisthenics and Swedish movements, elementary apparatus, and games are taught.

Hygiene and social problems are discussed. This instruction gives an insight into the practical problems of daily healthful living from a personal point of view. Directions are given for avoiding the common ills of student life, and for maintaining the highest physical and mental condition while in the school, as well as for gaining the highest development of vital power and health for future duties.

52. PHYSICAL TRAINING M-II. Second semester. Two hours. One semester credit. Required of all young men during their second semester in the school.

This course is a continuation of Physical Training M-I. In the spring, as soon as weather conditions allow, the work consists of baseball and track and field athletics.

WOMEN'S DEPARTMENT

75A, 76. PHYSICAL TRAINING W-I AND W-II. First and second semesters, respectively. Three hours. One semester credit for each course. Miss Bond and Dean Van Zile.

This is an introductory course. It includes corrective exercises, light apparatus work, folk dancing, games, and swimming. A physical examination is made of each young woman before she enters upon the work.

Instruction in hygiene and social problems is an essential part of course 75A. In these lectures, which are given by Mary P. Van Zile, dean of women, in addition to the problems of hygiene as applied to individual health, the biological truths that lead to serious, respectful consideration of social and sex hygiene are presented.

77, 78. PHYSICAL TRAINING W-III AND W-IV. First and second semesters, respectively. Three hours. One semester credit for each course. Miss Bond.

These courses are a continuation of Physical Training W-I and W-II. Esthetic dancing, Swedish gymnastics, games, and swimming are taught in these courses.

PHYSICS

51. PHYSICS A-I. Second or third year, first semester. Class work, three hours; laboratory, two hours. Four semester credits. Assistant Professor Hartel, Mr. Cummings, and Miss Taylor.

The fundamental laws of mechanics, heat and sound are presented in this course. The application of principles to the common things of everyday life is emphasized. The laboratory work is based upon the work done in class, and is outlined in such a manner as to give the students special drill in exact measurements. Text: Black and Davis's *Practical Physics*.

52. PHYSICS A-II. Second or third year, second semester. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Physics A-I. Assistant Professor Hartel, Mr. Cummings, and Miss Taylor.

This course is a continuation of Physics A-I. The subjects of magnetism, electricity, and light are considered. An introductory study is made of the units used in measuring electrical energy, the principles involved in current distribution, the uses now being made of electricity, the ordinary phenomena of light, and questions of modern illumination. Text: Black and Davis's *Practical Physics*.

61. PHYSICS H-I. Third year, first semester. Class work, three hours; laboratory, two hours. Four semester credits. Assistant Professor Converse and Miss Taylor.

The work given in this course has a direct bearing on the principles of mechanics, sound and heat as they apply to the home. The laboratory work is especially adapted to this phase of the work. Text: Tower, Smith and Turton's *Physics*.

62. PHYSICS H-II. Third year, second semester. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Physics H-I. Assistant Professor Converse and Miss Taylor.

This course is a continuation of Physics H-I. The fundamental principles and laws of electricity and light are presented in this course, with special applications of the use of electricity in the home. Laboratory work is based on the study of simple electrical appliances used in the home. Text: Tower, Smith and Turton's *Physics*.

ZOOLOGY

51. ELEMENTARY ZOOLOGY. Second year, second semester. Class work, one hour; laboratory, four hours. Three semester credits. Mrs. West.

This course deals with the natural history of animals. The two hours of class work are devoted to résumés of the field and laboratory work and to general matters of animal biology. The laboratory work consists of one three-hour period a week. This work is carried on for the most part out of doors. Ponds and streams, meadows and woodlands are visited and animals are studied in their relation to each other and to their environments. Numbers of animals are brought to the laboratory, where they are kept in vivaria, and such study is given them as is not possible out in the field.

Mechanic Arts Courses

ARCHITECTURE

52. FREE-HAND AND OBJECT DRAWING. First year, first semester. Drafting room, four hours. Two semester credits. Mr. Dehner.

The work of this course includes exercises in drawing simple objects; the principles of perspective are studied and illustrated by drawing from geometric solids.

APPLIED MECHANICS

51. CONCRETE CONSTRUCTION I RECITATION. First year, both semesters. Lectures and recitations, one hour. One semester credit. Assistant Professors Robert and Dawley.

Instruction is given in the principles governing the selection and preparation of materials, the proper proportioning of materials for different conditions, the construction of forms, mixing and handling concrete, elementary reinforced concrete construction, finishing concrete surfaces, stucco and plaster work, and waterproofing and coloring concrete. A brief study is made of the application of these principles to the making of concrete foundations, building blocks and bricks, posts, sidewalks, floors, tanks, cisterns, silos, bridges, and culverts. Text: Seaton's *Concrete Construction for Rural Communities*.

55. CONCRETE CONSTRUCTION I LABORATORY. First year, second semester. Laboratory work, two hours. One semester credit. Must accompany or follow Concrete Construction I Recitation (Ap. Mech. 51). Assistant Professors Robert and Dawley.

Laboratory and field work is given in hand and machine mixing and handling of concrete, and in the construction of forms for such objects as machine and building foundations, floors, sidewalks, fence posts, and building blocks. Tests are made on concrete cylinders and beams to illustrate the effect of different methods of treatment on the strength and reliability of plain and reinforced concrete.

73. ELEMENTARY MECHANICAL DRAWING. First year, second semester. Drafting-room practice, four hours. Two semester credits. Mr. Tew.

This course comprises free-hand lettering, the use of drawing board, T-square and instruments, geometrical constructions, and orthographic projections and sections of simple objects. Accuracy is emphasized. Text: French and Svensen's *Mechanical Drawing for High Schools*.

80. SHOP DRAWING I LABORATORY. Second year, first semester. Drafting-room practice, four hours. Two semester credits. Mr. Hunt.

Practice is given in lettering, in the construction of orthographic, cabinet, and isometric projections of objects, revolutions, intersections and development of surfaces, sheet-metal drafting and the construction of paper models of sheet-metal problems.

* 90. SHOP DRAWING II LABORATORY. Second year, second semester. Drafting-room practice, four hours. Two semester credits. Mr. Hunt.

Working drawings are made from plates during the first part of the semester. Later, free-hand sketches are made of simple machine parts, and working drawings are made from these sketches. Practice is given in making tracings and blue prints.

95. SHOP DRAWING III. Third year, second semester. Drafting-room practice, four hours. Two semester credits. Prerequisite: Shop Drawing II (Ap. Mech. 90). Mr. Hunt.

Practice is given in making working drawings from free-hand sketches of machine parts, assembly drawings, and in designing simple machine parts by empirical methods.

FARM ENGINEERING

51. ELEMENTARY FARM MACHINERY. Second year, first semester. Class work, one hour; laboratory, two hours. Two semester credits. Mr. Driftmier.

In this course the student is taught the principles underlying the construction, operation, and adjustment of the different types of farm machinery. Instruction is also given in fencing, rope work, and belt splicing. Proper adjustment and operation of machines is taught in the laboratory and in the field.

66. ELEMENTARY TRACTION ENGINES I. First and second years, both semesters. Laboratory, four hours. Two semester credits. Prerequisite: Farm Gas Engines I (Farm Engr. 75). Associate Professor Sanders and assistants.

A study is made of gas traction engines, including motors, frames, transmission systems, cooling systems, ignition systems, lubricating systems, and carburetors; operation, care, repair, and testing of gas traction engines.

69. ELEMENTARY TRACTION ENGINES II. Second and third years, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Elementary Traction Engines I (Farm Engr. 66). Associate Professor Sanders and assistants.

Practice is given in the operation, care, and testing of various types of gasoline and kerosene traction engines, including belt tests, road tests, and field tests.

72. ELEMENTARY TRACTION ENGINES III. Third year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Elementary Traction Engines II (Farm Engr. 69). Associate Professor Sanders and assistants.

This is a continuation of Elementary Traction Engines II, and includes special tests on gas traction engines.

73. ELEMENTARY FARM SANITATION AND WATER SUPPLY. Elective, first semester. Class work, two hours. Two semester credits. No prerequisite. Professor ———.

Sources of water supply, installation of cisterns on the farm, and farm sanitation are studied in this course. No text is used, the instruction being given by lectures, bulletins, and library references.

75. FARM GAS ENGINES I. First year, both semesters. Class work, one hour; laboratory, two hours. Two semester credits. Mr. Driftmier.

A study is made of gasoline and kerosene engines; four-stroke and two-stroke cycle engines, gas-engine fuels, carburetors, ignition systems, lubrication, governing; selection, erection, and operation of stationary gasoline and kerosene engines; fundamental parts of automobiles.

77. FARM GAS ENGINES II. Second year, both semesters. Laboratory, six hours. Three semester credits. Prerequisite: Farm Gas Engines I (Farm Engr. 75). Associate Professor Sanders and assistants.

A detailed study is made of gas-engine operation and care, with special attention to ignition systems, carburetors, and testing. Automobile parts, including engines, differentials, transmissions, lubricating systems, clutches, systems of ignition, starters, and carburetors; tests of ignition equipment and carburetors are also studied.

80. FARM GAS ENGINES III. Third year, first semester. Laboratory, six hours. Three semester credits. Prerequisite: Farm Gas Engines II (Farm Engr. 77). Associate Professor Sanders and assistants.

This course consists of the operation, repair, and testing of gas and oil engines.

SHOP WORK

51. CARPENTRY I. First year, both semesters. Laboratory, four hours. Two semester credits. Mr. Parker and Mr. Aiman.

This is a course of exercises in constructive carpentry, which are so graded as to give the student the principles of general carpenter work, and training in the proper use of tools and in the reading of drawings and blue prints. Some work is given to bring out the principles of framing and building operations, and practice is given in the use of paints and varnishes as protective coverings for woodwork. Text: Wood and Smith's *Prevocational and Industrial Arts*.

54. CARPENTRY II. Second year, first semester. Laboratory, six hours. Three semester credits. Prerequisite: Carpentry I (Shop 51). Mr. Parker and Mr. Aiman.

This course includes exercises in turning cylinders, cones, beads, convex and concave turning, and exercises that will involve the use of all the different turning tools, and turning between centers, on the face-plate, and with hollow chucks. Some of the exercises are: tool handles, dumbbells, rolling-pins, napkin rings, table legs, porch posts, balusters, built-up and solid newel posts, columns, and rosettes. Text: Griffith's *Woodwork for Secondary Schools*.

57. CARPENTRY III. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Carpentry II (Shop 54). Mr. Parker and Mr. Aiman.

This course includes a combination of machine and hand work where the material is worked up on the machines and then fitted by hand. Some of the work consists of making plain and fancy casings, plate rails, picture molding, picture frames, and simple pieces of furniture, which are stained, varnished, or otherwise finished.

60. CARPENTRY IV. Third year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Carpentry III (Shop 57). Mr. Parker and Mr. Aiman.

This course consists of hand work with the rabbet, router, beading and matching planes, and with the dado, plow, and fillister in making window sashes and frames, doors and frames, grooved flooring, door jams, and molding.

64. CARPENTRY V. Third year, second semester. Laboratory, supplemented by lectures, six hours. Three semester credits. Prerequisite: Carpentry I (Shop 51). Mr. Parker and Mr. Aiman.

The fundamental factors to be taken into consideration in the construction of buildings, as selection of the building site, laying out and squaring the foundation, excavating, types of foundations, form building for concrete, anchoring, placing of the sills, joists, bridging and studding, and bracing, rafter cutting and fitting, are studied in this course. The laboratory work consists of exercises along the lines given above. Text: Griffith's *Carpentry*.

66. CARPENTRY H. First year, second semester. Laboratory, four hours. Two semester credits. For women only. Mr. Parker and Mr. Aiman.

A practical course in woodwork, in which the student makes simple articles, the making of which gives the proper training in the use of tools, and familiarity with the different kinds of woods, stains, varnishes, and paints. Supplementary lectures are given along with the laboratory work in order to bring out the different points more clearly.

69. BLACKSMITHING I. First year, first semester. Laboratory, four hours. Two semester credits. Assistant Professor Lynch and Mr. Granell.

This is a very practical course in the forging operations, such as drawing, upsetting, welding, bending, twisting, and punching, together with instruction in the proper use and care of the fire and tools, and in handling the metals in the forge. Tools required: A two-foot rule, a pair of five-inch outside calipers, a center punch and a ball-pein hammer weighing, with handle, about two pounds.

72. BLACKSMITHING II. First year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Blacksmithing I (Shop 69). Assistant Professor Lynch and Mr. Granell.

This work consists of the making of such tools as punches, chisels, drills, scrapers, hammers, and other tools that are used in the trade. Tools required: Same as for Blacksmithing I.

88. MACHINE SHOP I. Second year, first semester. Laboratory, four hours. Two semester credits. Assistant Professor Jones and Mr. Bowhay.

Practical machine work in the building and assembling of gas engines and wood lathes. Exercises are given to bring into use the various machines in the shops. Tools required: A four-inch scale or B. & S. slide caliper, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, and one B. & S. center gage.

90. MACHINE SHOP II. Second year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Machine Shop I (Shop 88). Assistant Professor Jones and Mr. Bowhay.

This course embraces practical work in making repairs on machinery, such as babbitting and fitting bearings, aligning shaftings and pulleys, lacing and fitting belts, and general repair work on engines and other machinery.

93. MACHINE SHOP III. Third year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Machine Shop II (Shop 90). Assistant Professor Jones and Mr. Bowhay.

A continuation of the preceding term's work, with work on the milling machines, universal grinder, and screw machines.

95. AUTOMECHANICS I. Second year, first semester. Class work, one hour. Laboratory, four hours. Three credits.

This course consists of a study of the mechanical construction of the car, including the transmission, rear axle, clutches, brakes, steering gear, bearings, frames, and the automobile engine, as well as the lighting, ignition, starting, and generating units. The class work will be supplemented by the laboratory work, which will be closely related.

97. AUTOMECHANICS II. Second year, second semester. Class work, one hour. Laboratory, four hours. Three credits.

This is a continuation of Auto Mechanics I, with the addition of work in the repair shop, consisting of valve grinding, gear adjusting, ring fitting, battery work, testing generators, starting motors, coils, etc.

Home Economics Courses

APPLIED ART

51. ELEMENTARY DESIGN. First year, second semester. Laboratory, six hours. Three semester credits. Miss Evans.

The principles underlying pleasing color combinations, fine proportions, and consistent arrangement of parts are studied. Many exercises are given in selecting from objects of clothing and house furnishings those involving color harmonies, consistent shapes, and orderly arrangement. Original problems are given in the application of these principles.

56. HOUSE PLANNING AND FURNISHING. Third year, second semester. Class work, one hour; laboratory, six hours. Four semester credits. Prerequisite: Elementary Design. Miss Evans.

Planning of a house, also each room, with regard to convenience and comfort. An adaptation is made to location and needs of the family, sanitation, modern conveniences, etc. Principles of color, form and arrangement are studied in application to all problems involved in home decoration, such as window, door and wall spacings, woodwork, wall coverings and floor coverings; appropriate furniture, and the arrangement of these in different rooms.

CLOTHING AND TEXTILES

57. GARMENT MAKING I. First year, first semester. Recitation, one hour; laboratory, four hours. Three semester credits. Miss Polson.

In this course and the following, practice is given in the fundamental stitches and in the use of the sewing machine and of commercial patterns in the making of undergarments. A study is made of the characteristics of cotton fiber and cotton goods suitable for underwear, and practice is given in identifying the various kinds and qualities of cotton goods on the

market. In the selection of the material, trimming and style of the garments which are made, attention is given to cost, durability, laundering qualities, and hygiene. An itemized account is kept of the time and money used in making each garment, and comparisons are made with ready-to-wear garments.

58. **GARMENT MAKING II.** First year, second semester. Recitation, one hour; laboratory, four hours. Three semester credits. Miss Polson.

This course is a continuation of Garment Making I, in which the laboratory work consists in the making of cotton garments of more difficult construction.

59. **CLOTHING PROBLEMS AND DESIGN.** Second year, first semester. Recitation, two hours; laboratory, four hours. Four semester credits. Associate Professor Cowles.

This course deals with the planning, selecting, making and care of clothing for the different members of the family. Clothing design is studied with a view to its usefulness in selecting styles, colors and materials of ready-made clothing, as well as in planning garments from the standpoints of cost, health, suitability and style; each girl plans her own clothing budget and keeps account of her clothing expenditures. The clothing needs of the other members of the family are considered, with special attention to infants and children, and budgets are worked out for actual families. The advantages and disadvantages of ready-made clothing, and the problems which arise in its purchase, are considered. The selection and care of household linens are studied.

In the laboratory work, children's clothing is made and practice is given in mending, renovating, and remodeling worn clothing.

60. **DRESSMAKING AND MILLINERY.** Third year, first semester. Laboratory, six hours. Three semester credits. Miss Worcester.

Through work in the laboratory the problems connected with the construction of silk and wool dresses and of millinery are studied, each girl completing at least one wool or silk dress and one hat. The choice of materials, trimming and style appropriate to each individual is considered. Practice may be obtained in simple embroidery and other hand-work used in trimming dresses or hats.

FOOD ECONOMICS AND NUTRITION

55. **ELEMENTARY FOOD STUDY I.** First year, first semester. Recitation, one hour; laboratory, four hours. Three semester credits. Miss Kirkpatrick.

The recitations in this course and in Cooking II are spent in a brief study of the source, composition, production and marketing of the various foods studied in the laboratory. The laboratory work includes practice in cooking fruits, vegetables, cereals and starchy products, simple desserts, candies, and the use of fats in frying and in salad dressings.

56. **ELEMENTARY FOOD STUDY II.** First year, second semester. Recitation, one hour; laboratory, four hours. Three semester credits. Prerequisite: Course 55 or its equivalent. Miss Kirkpatrick.

Flour mixtures and leavening agents are studied, especially as applied to the making of hot breads, cake and pastry; the remainder of the laboratory work is devoted to the principles involved in the cooking of various protein-containing foods, such as eggs, milk, cheese, meats, fish, poultry, legumes and nuts. One or two simple meals are prepared and served in the laboratory. Especial emphasis is laid on the planning of menus for meatless meals.

57. **FOOD PROBLEMS I.** Second year, first semester. Laboratory, four hours. Two semester credits. Prerequisites: Courses 55 and 56, or their equivalent. Miss Traill.

The canning and drying of fruits, vegetables and meats; the preparation of jellies, jams, preserves and pickles; preservation of eggs; more advanced work with flour mixtures, including bread making; preparation of more elaborate desserts, such as ice creams, sherberts, frappés, and steamed puddings; the making of various salads and sandwiches, and the utilization of left-over foods, comprise the work of this course.

58. **FOOD PROBLEMS II.** Second year, second semester. Recitation, two hours; laboratory, four hours. Four semester credits. Prerequisites: Courses 55, 56, and 57, or their equivalent. Mrs. Aubel.

In this and the preceding course, special emphasis is laid on the dietetic value and economic uses of foods. The work of this course includes the following: a brief consideration of the requirements of an adequate diet, together with planning of meals to meet these requirements; modifications of diet as required for students, men at hard manual labor, infants and small children, school children, the sick and aged; planning food for family groups and at stated costs; conservation of food, fuel and labor; practice in marketing and serving; planning and serving meals for special occasions and for large numbers. Meals are frequently prepared and served by the class throughout the semester to illustrate the principles brought out in class discussion.

HOUSEHOLD ECONOMICS

63. **HOME MANAGEMENT.** Second year, second semester. Recitation, two hours; laboratory, two hours. Three semester credits. Assistant Professor Leazenby.

This course deals with the planning, furnishing and management of the home from the standpoint of efficiency. It includes a study of kitchen plans and equipment; arrangement of other rooms and of storage space; equipment and methods in cleaning and laundering; planning schedules of housework; planning family expenditures; keeping household accounts; buying household supplies.

64. **HOUSE SANITATION.** Third year, first semester. Recitation, two hours; laboratory, two hours. Three semester credits. Miss Lauder.

The location, ventilation, heating and lighting of the house, and rural and municipal water supply and sewage disposal, are considered from the standpoints of health, convenience and cost. The sanitary care of the house and of foods is studied, and the relation between public health problems and home sanitation is examined. The laboratory work includes the first-hand study of the sanitary conditions and equipment of local homes, streets, stores and other buildings, of the local water supply and sewage-disposal systems, and of local public health activities affecting the home.

65. **CHILD CARE AND HOME NURSING.** Third year, second semester. Recitation, two hours; laboratory, two hours. Three semester credits. Assistant Professor Leazenby.

This course deals with the care of the mother and the preparation of the clothing and other supplies before the baby's birth; the bathing, dressing, feeding and daily routine of the infant; the care and training of children at different stages in their development, in accordance with their physical, mental, and emotional needs; the nature and symptoms of the diseases to which children are susceptible; the methods of preventing these diseases and of nursing the sick child; the treatment of emergencies and accidents in the home.

Special Courses

Short Courses Related to Engineering

Automobile Operation
Automobile Repair
Tractor Operation
Foundry Practice

Carpentry
Machine Shop Work
Blacksmithing
Electrical Repair Work

The following short courses are intended for those who have not the time or the means to take any of the regular engineering courses in the College, but who wish to obtain a practical working knowledge of one of the trades related to engineering.

Students can enroll in any of these courses, except electrical repair work, on the first Monday of any month from September to June. Instruction is suspended during the month of August. The course in electrical repair work begins on the first Monday of January only. The courses in automobile operation, tractor operation, and electrical repair work each require eight weeks. Automobile repair, carpentry, machine shop, foundry, and blacksmithing courses require twelve weeks or more, depending on the previous training and experience of the individual.

There is no charge for tuition, but an incidental fee of \$5 for the eight-weeks courses, or \$10 for the longer courses, not exceeding eighteen weeks in length, is charged at entrance. A sick benefit fee of \$1 for the eight-weeks courses, or \$1.50 for the longer courses, is also charged, and entitles the student to free medical attendance from the College physician. Laboratory charges to cover the cost of materials used are made in accordance with the following schedule: automobile operation, automobile repair, tractor operation, blacksmithing, machine shop, and electrical repair courses, \$18 for each four weeks; carpentry and foundry courses, \$9 for each four weeks.

The College reserves the right to revise its schedule of fees at any time without notice.

AUTOMOBILE OPERATION. This course, covering a period of eight weeks, is adapted to those who wish to learn how to operate and repair their own automobiles. Two weeks of the course is spent in studying the lighting, ignition, starting, and generating systems used on the various cars, and the proper method of caring for them. Three weeks is spent in the automobile laboratory working with electrical and fuel systems used on the Ford, Dodge, Cadillac, Buick, and other popular cars. One week is given to soldering and babbitting, and two weeks to such work as grinding valves, fitting bearings, cleaning out carbon, fitting rings, lapping in pistons, adjusting ring and pinion gears, fitting gaskets, relining brakes, tube repairing, and other work of particular value to the automobile owner.

AUTOMOBILE REPAIR. This course is designed for those who expect to enter commercial shops and work as garage mechanics. Two weeks are spent studying the electrical equipment of the automobile, including the

construction and operation of batteries, magnetos, coils, ignition, lighting, starting, and generating systems, cut-out relays, regulators, circuit breakers, ammeters, and switches; three weeks in the automobile laboratory working with the more popular cars on the ignition, starting, lighting and generating systems, and on wiring, carburetion, and troubleshooting exercises; one week in soldering and babbiting; one week in studying the construction of the various parts of the chassis, including frames, springs, axles, bearings, steering gears, tires; five weeks in the automobile repair laboratory, fitting bearings, pistons, rings, adjusting gears, timing valves and ignition, grinding valves, overhauling generators, motors, distributors, testing coils, ammeters, and the like.

TRACTOR OPERATION. The tractor course covers thoroughly the construction, operation, and adjustment of all kinds of tractors and their equipment; stationary gas engines; power farm machinery, including tractor hitches; and shop work.

About twenty tractors and twenty-five stationary gas engines are available for the laboratory work in this course, besides great numbers of smaller items of equipment in the way of magnetos, carburetors, and other attachments.

CARPENTRY. A practical study is made of general carpenter work, including the use of carpenters' tools, reading of drawings and blue prints, hand work and machine work, framing, building construction, and form building for concrete.

MACHINE SHOP WORK. This course in machine tool work is designed to meet the demands of those who must prepare themselves in a short time for this line of work. The work is adapted to the needs of the individual student. The entire machine shop of the College is available for this course, which includes a thorough training in the operation of lathes, planers, drill presses, boring mills, shapers, and grinding machines.

In order to enable the student to become familiar with both tools and shop processes, the construction of standard gasoline engines and wood lathes is followed from the machining of the rough castings to the assembly of finished parts. Students may in this way make their own engines and lathes.

FOUNDRY PRACTICE. This course is intended to train practical molders, and includes bench molding with a great variety of patterns; work with different kinds of sands and facings; open sand work; sweep molding; machine molding; core making; setting of cores, gates, and risers; different methods of venting; and general foundry practice.

BLACKSMITHING. A practical course is given in forging operations, such as drawing, welding, bending, twisting, and punching iron and steel, the care of forge fire; the making of various tools, such as punches, chisels, drills, scrapers, and hammers; hardening, tempering, annealing, case and pack hardening; and oxyacetylene and thermit processes of welding.

ELECTRICAL REPAIR WORK. This course is intended to train electricians, and includes electric wiring, and the operation of dynamos, motors, and other electrical equipment.

Farmers' Short Course

The Agricultural College offers in agriculture primarily a four-year curriculum, which gives the student fundamental training in the sciences relating to agriculture and their application to the production of crops and live stock and to farming in general. Such a curriculum not only equips a man to become a successful farmer, but makes of him a better citizen, and a leader in the broader duties of life.

Many men who have chosen farming as their vocation, and who are alive to some of the advantages offered by this institution to the farmers of the state, are denied the opportunity of pursuing the College curriculum in agriculture, or even as much as one year's work in that curriculum. For such men the Agricultural College provides the Farmers' Short Course.

This course is given for a period of eight weeks, practically the months of January and February, each year. It consists of an intensive study of a number of important phases of Kansas agriculture. The scope and nature of the work are indicated by the following outline of the subjects offered:

SUBJECTS IN FARMERS' SHORT COURSE

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and laboratory, respectively.

| | |
|----------------------------------|--------|
| Soils and Fertilizers | 4(4-0) |
| Grain Crops | 4(3-2) |
| Forage Crops | 4(3-2) |
| Live-stock Production | 8(6-4) |
| Live-stock Sanitation | 3(3-0) |
| Advanced Stock Judging..... | 2(0-4) |
| Dairying I | 5(3-4) |
| Dairying II | 5(3-4) |
| Farm Horticulture | 8(6-4) |
| Poultry Husbandry | 3(3-0) |
| Incubation and Brooding (a)..... | 3(0-6) |
| Farm Management | 4(3-2) |
| Beekeeping | 6(4-4) |
| Farm Insects | 2(2-0) |
| Injurious Rodents | 2(2-0) |
| Field Machinery | 1(0-2) |
| Special Lectures | 1(2-0) |

For each hour of recitation per week usually at least one hour of outside preparation is required. Laboratory or field work requires little or no outside preparation. Each credit (standard for measuring the quantity of work done) represents not less than two hours' work per week for the entire eight weeks of the term. A regular, full-time assignment consists of not less than twenty credits, and students are usually not encouraged to take more than twenty-four credits.

All the work is elective. That is, each student selects, with the advice of members of the Faculty, the subjects of his greatest interest or those he feels will do him the most good. Besides studying the subjects heretofore listed, the student may spend one, two, or three half-days each week in instruction and practice in carpentry or blacksmithing, or both.

Students desiring further work in farm engineering are referred to "Special Courses Related to Engineering," discussed elsewhere in this

(a) This work is all practice work under supervision. Each student taking the subject must report to the Poultry Farm three times a day, seven days a week.

catalogue. For example, a man may take intensive work for the training of automechanics or tractor operators during part or all of the months of September, October, November and December, or during part or all of the months of March, April and May, and during the months of January and February devote himself almost exclusively to Farmers' Short-course work.

It must be noted that Farmers' Short-course work cannot be taken at any other time during the year than during this midwinter, eight-week term. Furthermore, students expecting credit must continue the work for the entire term.

CERTIFICATE. Most students will find it impossible to carry all the Farmers' Short-course work in which they are interested during one eight-week term. Such students are encouraged to take other subjects for a second winter term. Subjects in addition to those already listed may be provided to meet special demands as they arise. A certificate will be granted to each student completing satisfactorily forty credit hours of short-course work.

REQUIREMENTS FOR ADMISSION. This course is intended primarily for mature individuals. High-school work in the state is becoming so general and available to all communities that the demand for short-course work for boys of high-school age is being greatly reduced. Young farmers, not in school, are especially urged to consider the advantages of the Farmers' Short Course. Students over seventeen years of age are admitted without examination.

There is no charge for tuition, but each student is required to pay, on enrollment, an incidental fee of \$5, also a sick-benefit fee of \$1. This latter fee entitles him to free medical attendance by the College physician. In several of the laboratories, laboratory deposits varying from 50 cents upward must be made to cover cost of materials used.

SELF SUPPORT. The subjects of this course are primarily practical. They bring the student into actual contact with farm conditions and products. Besides the classroom work, many hours each week are spent in the stockjudging pavilion, laboratory, shop, and barn. This leaves the student but little time for outside labor, and students are therefore advised to come provided with as nearly all the necessary funds for the course as possible.

BRIEF DESCRIPTION OF THE WORK

SOILS AND FERTILIZERS. (Agron. 3.) In this class the various soil types common in Kansas are studied, especially with reference to their economical management for the production of profitable crops and the maintenance of fertility.

GRAIN CROPS. (Agron. 1.) The work in this subject consists of a practical study of graincrop production. In the laboratory exercises are given for the identification of different kinds of threshed grain and the determination of damage and market classes and grades.

FORAGE CROPS. (Agron. 2.) This class makes a study of the distribution and production of important forage crops, especially for Kansas conditions. Practical exercises in identification are given in the laboratory.

LIVE-STOCK PRODUCTION. (An. Husb. 6.) The work of this class consists of a study and discussion of the elementary but fundamental principles of live-stock feeding, breeding, and management. Some attention is given to the history of breeds and pedigrees and to fitting for shows and sales. About three-fourths of the time in the laboratory is devoted to judging various classes and market grades of live stock, and the remainder to demonstrations in the killing, cutting, curing and storing of meats on the farm.

LIVE-STOCK SANITATION. (Vet. Med. 1.) This subject deals with diseases that are communicable from animal to animal or from animal to man. The causes, symptoms and methods that are employed to prevent and to combat the spread of diseases, and the drugs that are commonly used as disinfectants, for washes, dips, etc., are given full consideration. The use of serums, vaccines, etc., for the prevention of diseases is considered. Methods of disposal of sick and dead animals as well as the means employed to clean and to disinfect the premises so as to prevent a recurrence of diseases are considered.

ADVANCED STOCK JUDGING. (An. Husb. 7.) The work of this class consists largely of the judging of breeding classes of horses, cattle, sheep, and swine. Methods used in judging at county and state fairs are followed. Special attention is given to the selection of foundation stock for pure-bred herds.

DAIRYING I. (Dairy Husb. 1.) This class considers the general subject of farm dairying, including the composition and properties of milk, the feeding of the dairy cow, the selecting and breeding of the dairy herd, and dairy sanitation. The laboratory provides practical work with the Babcock tester, in the use of the farm separator, and in butter making.

DAIRYING II. (Dairy Husb. 3.) Among the subjects studied and discussed in this class are the following: Keeping records and accounts of dairy-farm business; building up the dairy herd; dairy buildings and equipment; silos and silage; the dairy business and soil fertility; cow-testing associations; coöperative ownership of dairy sires; and detailed plans for the management of the dairy farm. Laboratory work consists of judging dairy cattle from the standpoint of economical production and breed type. Score cards are used for the purpose of making the student systematic and accurate in the selection of dairy animals.

FARM HORTICULTURE. (Hort. 1.) The class work covers vegetable gardening and fruit growing, particular attention being paid to their relation to other farm enterprises. An attempt is made to acquaint the student with those horticultural principles and practices which are concerned in making the farm a better place for a home. The planning of the farmstead and the improvement of its appearance by the use of trees, shrubs and flowers is considered. Methods of handling and marketing products are briefly discussed. The laboratory work gives students practice in budding, grafting and other methods of plant propagation, as well as in pruning. Spraying and orchard management are briefly discussed.

POULTRY HUSBANDRY. (Poult. Husb. 1.) The work in Poultry Husbandry covers the practical phases of poultry management, including feeding, breeding, housing, incubation, and brooding.

INCUBATION AND BROODING. (Poult. Husb. 2.) This work is entirely individual practice work, each student carrying through a hatch and brooding the chicks. The student cares for the incubator, tests the eggs,

and keeps necessary records. He also has entire care of brooding and feeding the chicks during the most critical weeks.

FARM MANAGEMENT. (Ag. Ec. 1.) In this class the work in the various agricultural subjects is correlated and placed on a practical, workable basis. The principles of farm accounting, distribution of capital, laying out of fields, planning rotations, etc., are given first consideration.

BEEKEEPING. (Ent. 10.) This subject considers the elements of practical beekeeping. The topics discussed include: Life history, behavior and instincts of the honeybee; products of the apiary; and relation of bees to crop production. A study is made of the various bee diseases, together with their treatment. The laboratory exercises consist of practice in constructing hives, supers, brood frames, comb-honey sections, extracting frames, and wiring frames; also of practice in putting in and embedding foundation. Demonstrations are given of various methods of transferring bees, manipulating colonies for swarm prevention and making increase, treatment of brood diseases, and wintering. The object of the work is to give such practical training as will prepare the student to engage successfully in beekeeping.

FARM INSECTS. (Ent. 1.) The serious insect pests of the farm, garden and orchard and those affecting domestic animals are discussed in this class. Methods of control are emphasized and the importance of clean culture and good farm methods is fully considered. Lantern slides are used in some of the presentations.

INJURIOUS RODENTS. (Zoöl. 1.) In this class a study is made of injurious rodents, especially gophers, prairie dogs, rats, mice, moles and rabbits, emphasizing their habits and the methods of poisoning, trapping, and otherwise destroying them.

FIELD MACHINERY. (Farm Engr. 1.) In this subject practical laboratory work is done by the student, the purpose being to acquaint him with the factors underlying wise selection and proper care of farm machines, as well as with methods of operation of a number of the most important machines. Rope work is given due consideration. Fences and the farm power plant are studied.

SPECIAL LECTURES. It is desirable to have frequent assemblies of all Farmers' Short-course students. Many subjects of timely and special interest cannot be discussed effectively in the regular classes. Two hours each week are set apart to provide these general meetings and opportunity for the presentation of fundamental phases of the work of the course not otherwise provided for. One credit is given for attending these meetings, and every Farmers' Short-course student is urged to enroll. Among the speakers provided will be several members of the College Faculty, including the President of the College, and a few outside, well-known agricultural leaders.

Commercial Creamery Short Course

To young men in the state desiring to engage in the creamery business as managers, or as butter or cheese makers, or for those who desire to engage in the business of handling market milk or ice cream, the State Agricultural College offers an eight-week course of technical training along these lines. The scope of the work, the nature of its various phases, and the comparative amount of time devoted to each are indicated by the following outline:

SUBJECTS IN COMMERCIAL CREAMERY SHORT COURSE

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and laboratory, respectively.

| | |
|---|--------|
| Creamery Management | 2(2-0) |
| Creamery Butter Making | 8(4-8) |
| Market Milk | 2(2-0) |
| Dairy Bacteriology | 2(2-0) |
| Cheese and Ice Cream Making..... | 4(2-4) |
| Judging Dairy Products | 1(0-2) |
| Dairying II | 5(3-4) |
| Dairy Mechanics and Refrigeration | 2(0-4) |

There is no charge for tuition in this short course. Each student is required to pay on enrollment an incidental fee of \$5, a laboratory charge of \$2, and a sick-benefit fee of \$1. This latter fee entitles him to free medical attendance by the College physician.

A certificate will be issued to Creamery Short-course students who satisfactorily complete all of the required work outlined above, and who show satisfactorily evidence of having spent at least six months successfully in actual work in a creamery. Students without this practical experience may acquire it after completing the course. They will then receive their certificate.

BRIEF DESCRIPTION OF THE WORK

CREAMERY MANAGEMENT. This class makes a study of the management of dairy manufacturing plants. Particular attention is given to overrun, manufacturing losses, costs, marketing, advertising, salesmanship, and bookkeeping.

CREAMERY BUTTERMILKING. The lectures given in this class cover receiving, grading, and testing cream and milk; neutralization, pasteurization, and cream ripening; and churning, giving particular attention to the moisture content. The laboratory work consists of buttermaking in the College creamery and provides opportunity for the application of the principles discussed in the classroom.

MARKET MILK. The problems concerned in the care and handling of milk in city milk plants are discussed in this class. The subjects considered include standardization, separation, clarification, pasteurization, and bottling of milk and cream; also the care of utensils and the distribution of milk.

DAIRY BACTERIOLOGY. The work in this subject is chiefly laboratory work supplemented by brief lectures and explanations. It is designed for students who have had no training in chemistry and biology, and is a general study of the bacteriology of milk and milk products. Bacteriological contaminations of milk from air, water, utensils, the cow, and the

milker are discussed. Normal and abnormal fermentations, their significance and control in milk, butter, cheese, and special dairy products are considered.

CHEESE AND ICE CREAM MAKING. The class work in this subject considers the standardization of ice cream mixes for fat and total solids; the use of the emulsifier; and the freezing, packing, and storing of ice cream. Laboratory work provides actual experience in the application of the principles studied. While the major portion of the time is devoted to ice cream, due consideration and practice is provided in the manufacture of cheddar and soft cheeses.

JUDGING DAIRY PRODUCTS. The work provided for this class consists of scoring and judging butter, cheese, milk, and ice cream. It is chiefly laboratory work, though supplemented by occasional lectures.

DAIRYING II. This is the same subject as that included in the Farmers' Short Course, and a brief statement of the work included may be found in that write-up.

DAIRY MECHANICS AND REFRIGERATION. The work in this class provides careful consideration of the compression systems of refrigeration. It also includes the operation, care, and repair of refrigerating machinery and its auxiliaries.

COURSE IN TESTING DAIRY PRODUCTS

The law of the state requires that all persons buying milk or cream by test must pass a satisfactory examination and secure a certificate from the state dairy commissioner. A four days' course for cream-station operators is offered at the College during Farm and Home Week to those who wish to gain, in a short time, skill and accuracy in the application of the various tests necessary in such work, and ability to pass the required examination. Applicants are given the opportunity of doing practical work in sampling, testing and grading cream. Lectures are given on points which are necessary for the successful operation of a cream station. A written examination is given on the last day of the course.

Final examinations are regularly held at the College the first Tuesday in each month. Final examinations are also held at various places throughout the state during the year for those who are unable to make the trip to Manhattan. Schedules of these examinations may be had by writing the State Dairy Commissioner, Manhattan, Kan.

Milling Industry Short Course

The regular College courses offered by the Department of Milling Industry are intended to apply primarily toward required work for graduation. However, not all students may enjoy the opportunity of taking regular courses in college, and therefore seek whatever benefits may be derived from taking short intensive courses which are so planned as to reduce somewhat the necessity for prerequisite training and to stress primarily the demonstration and practice phases of the work.

To meet the needs of some of these students the Department of Milling Industry offers the following short course:

TESTING OF WHEAT AND MILL PRODUCTS. This course affords opportunity for making experimental milling tests and experimental baking tests as well as practice and demonstration in the following chemical determinations: Absorption, gluten, ash, moisture, acidity, and protein. Special lectures will also be given on wheat classes and grades, flour and feed classes, and on insects injurious to stored grain and mill products.

The well-equipped mill and laboratories used for College courses are available to short-course students taking this work.

This course lasts for four weeks and begins the first Monday in May. An incidental fee of \$2.50 is charged and there is a laboratory fee of \$10 to cover the cost of materials used.

Housekeepers' Course in Home Economics

There are large numbers of young women who, from lack of time, are unable to take an extended course, but who recognize the need for special training in home making. The twentieth century demands of home managers an understanding of the sanitary requirements of the home, a knowledge of values, absolute and relative, of the articles used in the house, quick attention to details, good judgment in buying, and a ready adaptation of means to the end in view. The purpose of the Housekeepers' Course is to furnish this training. The teaching in this course is no less accurate than in the regular course, but is necessarily different. Given to students without scientific training, the instruction must be more largely a presentation of facts, without an elaboration of the underlying principles. The work is intensely practical, and the hundreds of young women who take this course go back to their homes with a broader view of life, and a knowledge and training that will enable them to meet their responsibilities. This course is given during the first fifteen weeks of each semester.

REQUIREMENTS FOR ADMISSION. Young women between the ages of eighteen and twenty-one are admitted upon presentation of common-school diploma, grammar-school certificate, or high-school diploma. Young women over twenty-one years of age are admitted without examination.

HOUSEKEEPERS' COURSE

Cookery
Sewing
Hygiene

Floriculture
Design in the Home and in Clothing
Housewifery

1. COOKERY. Both semesters. Laboratory, nine hours.

Stoves, stove construction, stove management, and fuels are the first topics considered. This discussion is followed by experiments illustrating the effect of heat upon starch and proteins. The necessary elementary principles involved are then applied to the cooking of cereals, vegetables, beverages, breads, meats, soups, simple cake mixtures, and puddings, and to the canning and preserving of fruits and vegetables. Special attention is given to the planning and serving of meals.

2. SEWING. Both semesters. Laboratory, ten hours.

This course includes practice in hand and machine sewing and dress-making. The fundamental stitches are applied to simple articles and

to the repairing of garments. Practice is given in the use of the sewing machine, and in the adaptation of commercial patterns. Suitable materials and trimmings are discussed, and undergarments, a shirt waist, and a cloth dress are made. Notebook work is required.

3. **HYGIENE.** Both semesters. Class work, three hours.

This course deals with the principles of elementary hygiene and their application in the maintenance of personal health and of sanitary conditions in the home and community. A study is made of the prevention and control of disease through personal hygiene, the sanitary care of the house, and public-health work. Attention is also given to the recognition and reporting of symptoms, the practical care of the sick, and the giving of first-aid treatment in common emergencies in the home.

4. **DESIGN IN THE HOME AND IN CLOTHING.** Both semesters. Laboratory, six hours.

This course makes a study of the design principles used in dress and in the problems of the home. Suitable lines and colors for dress are discussed and many practical problems are given. In home decoration the study involves the choice and arrangement of furniture, the choice of wall paper and of rugs, the use of color in the home, and the selection and arrangement of pictures.

5. **FLORICULTURE.** Both semesters. Class work, two hours.

Lectures in the classroom are supplemented in the greenhouse by practical exercises dealing with the propagation and culture of flowers. Soil requirements, the planting of seeds, transplanting, cultivation, the making of cuttings, the selection of varieties adapted to the purpose of window gardening, and lawn planting and cutting are discussed in the lectures. An opportunity to become acquainted with the species recommended and with the operations necessary for their successful culture is afforded in the laboratory practice.

6. **HOUSEWIFERY.** Both semesters. Laboratory, three hours.

This is a course in practical housekeeping, emphasis being placed upon efficiency in the use of time, money, and strength. It includes a study of house plans, furnishings and equipment, the cleaning and care of rooms, laundering and the care of clothing, the planning of expenditures, buying of supplies, and keeping of accounts.

One-year Curriculum in Lunch-room Management

It is the purpose of this curriculum to offer training to mature women who are fitted by education and ability to carry on some form of lunch-room management. The positions open to such women will be commercial ones only, as the department reserves the right to recommend only the members of the College institutional classes for positions in educational institutions and hospitals.

The curriculum covers one year, and certificates are granted on the successful completion of the work.

REQUIREMENTS FOR ADMISSION. The curriculum is open to women twenty-five years of age or older. Applications for entrance must be made in writing, and applicants are chosen according to training and ability. The number in the class is limited to twenty, in order to give each member the personal training necessary.

HOW TO APPLY FOR ENTRANCE. A student desiring admission to this curriculum is asked to write a letter, stating her general qualifications and training, to the dean of the Division of Home Economics. After consideration by the dean of the division, the candidates for this course will be chosen.

LUNCH-ROOM MANAGEMENT CURRICULUM.

| | |
|---|----------------------|
| Principles of Cookery..... | 4(0-12) |
| Food Production and Marketing..... | 3(3-0) |
| Business English LR..... | 3(3-0) |
| Cafeteria Practice I..... | 2(0-6) |
| Sanitation and Hygiene..... | 1(1-0) |
| Furnishing and Decorating..... | 1(0-3) |
| Institutional Cookery..... | 4(1-9) |
| Accounting..... | 2(2-0) |
| Lunch-room Management..... | 2(2-0) |
| Cafeteria Practice II and Tea-room Service..... | 4(0-12) |
| Lunch-room Promotion..... | 1, for half semester |
| Meal Planning..... | 1, for half semester |

PRINCIPLES OF COOKERY. First semester. Laboratory, twelve hours.

The purpose of this course is to teach the principles of cookery by means of the preparation of different foods. This course includes both plain and fancy cookery. A standard system of measurement is taught, and special attention is given to training in accuracy, neatness, and economy in handling utensils and materials. Standard servings and the cost of prepared foods are carefully estimated.

2. FOOD PRODUCTION AND MARKETING. First semester. Class work, three hours.

The main points in source, production, and manufacture of foods are covered. Special stress is laid on marketing and buying for the lunch room. Food values are emphasized.

3. SANITATION AND HYGIENE. First semester. Class work, one hour.

The sanitary control of eating houses and food supply, together with the personal hygiene of the worker, are here discussed.

4. CAFETERIA PRACTICE I. First semester. Laboratory, six hours.

The purpose of this course is to make the student thoroughly familiar with the cafeteria. Experience is had in serving, checking and other details.

5. CAFETERIA AND TEA-ROOM PRACTICE. Second semester. Laboratory, twelve hours.

Experience in the cafeteria is continued, with practice in the preparation of food. During part of the course the students carry on a tea room in the dining room of the department. So far as it is practicable, opportunity is given to do catering. Careful attention is given to service and cost of maintenance.

6. BUSINESS ENGLISH LR. First semester. Class work and practice, three hours.

This course is designed to meet the needs of those who are especially preparing themselves to manage lunch rooms. Essential forms of business correspondence, contract forms, the best forms of making and displaying notices and posters, the best current literature in home economics, and well-directed cultural reading are given their proper emphasis.

7. FURNISHING AND DECORATING. First semester. Laboratory, three hours.

Color, form, and arrangement as applied to wall and floor coverings, furniture, linen, china, and silver are studied.

8. INSTITUTIONAL COOKERY. Second semester. Class work, one hour; laboratory, nine hours.

This course applies the principles of cookery to the preparation of large quantities of food for use in the cafeteria. The course is given in the kitchen laboratory of the cafeteria.

9. ACCOUNTING. Second semester. Class work, two hours.

This is a course in the elements of bookkeeping and of business practice as applied to the accounts of lunch rooms, tea rooms, and cafeterias.

10. LUNCH-ROOM MANAGEMENT. Second semester. Class work, two hours.

The course covers the field organization, equipment, service, and general management of lunch rooms.

11. MEAL PLANNING. Second semester. Class work, one hour for half the semester.

The planning of meals according to dietary standards is taught in this course. Practice is given in planning menus for cafeterias and tea rooms.

12. LUNCH-ROOM PROMOTION. Second semester. Class work, one hour for half the semester.

The purpose of the course is to show the practical application of the principles of advertising and publicity to the enterprises treated in the course in lunch-room management. The several kinds of advertising are taken up in their relation to the lines of business which the students plan to enter. The principles of typographical design as adapted to menu cards and other necessary printed material receive careful attention.

Degrees and Certificates Conferred

In the Year 1920

FIRST DIVISION, MAY 27

DEGREES CONFERRED

HONORARY DEGREES

DOCTOR OF LAWS

James Guthrie Harbord, B. S., Kansas State Agricultural College, 1886
Frank Winston Coe
Eli Alva Helmick

GRADUATE COURSES

MASTER OF SCIENCE

Dorothy Josephine Cashen, B. S., Carthage College, 1917
Ernest Edward Dale, A. B., University of Nebraska, 1913
George William Finley, B. S., Kansas State Agricultural College, 1896
Leonard Sinclair Hobbs, B. S., Texas Agricultural and Mechanical College, 1916
Harry Llewellyn Kent, B. S., Kansas State Agricultural College, 1913
Edward Staunton West, A. B., Randolph-Macon College, 1917

CIVIL ENGINEER

Arvid Anton Anderson, B. S., Kansas State Agricultural College, 1914
Andrew Earl Dyatt, B. S., Kansas State Agricultural College, 1917

UNDERGRADUATE CURRICULA

Division of Agriculture

BACHELOR OF SCIENCE IN AGRICULTURE

| | |
|-----------------------------------|-------------------------|
| Boyd Funston Agnew | Harry Hibbard Nelson |
| Glen Allen | Ralph Dale Nichols |
| Herbert Nickson Baker | Floyd Earl Oakes |
| Sherman Floyd Bell | Glenn William Oliver |
| Everett Allen Billings | Nevels Pearson |
| Nelson Boyle | Frederick John Peters |
| William Hurbert Brooks | Benjamin Rankin Petrie |
| Joseph Oscar Brown | Telford Ruddell Pharr |
| Raymond Campbell | Leo Dewey Ptacek |
| Joseph Hamilton Cool | William Ellet Robison |
| Warren Eugene Crabtree | Carl Otto Roda |
| Vernon Simpson Crippen | Walter William Rodewald |
| Charles Ranger Enlow | Winfield Foster Runyen |
| Morris Evans | Luella Schaumburg |
| Ward Willard Fetrow | John Ira Shoup |
| Paul Levi Findley | Theodore Thomas Swenson |
| Wilcox Foster | Charles Swingle |
| Edwin Edgar Gottman | Earl Hicks Teagarden |
| Harold Reed Guilbert | Donald Cheney Thayer |
| Frank Harold Gulick | Kyle David Thompson |
| Joseph Cunningham Gullledge | Francis David Totten |
| William Carlton Hall | Carl Fenton Trace |
| Francis Augustin Hennessy | William Ira Turner |
| Walter Rawlins Horlacher | Perttu Hannes Virtanen |
| Carl Lewis Howard | Albert Neal Waters |
| Gilford John Ikenberry | Sheppard Arthur Watson |
| Clare Kimport | Merrill Worthing Watt |
| Ernest Lee McIntosh | Francis George Welch |
| Ward Ray Miles | Ivan Alfred White |
| John Russell Mingle | Homer Bryan Willis |
| John Delmont Montague | Harberd Stephen Wise |
| Manoug Muguerditch Muguerditchian | Homer Carlton Wood |
| Arthur Leroy Myers | Harold Stephen Woodard |
| Jesse Bowman Myers | Theodore Franklin Yost |
| Phillip Earle Neale | Fred Frank Young |

DOCTOR OF VETERINARY MEDICINE

Emmet Stanley Bacon
Elmo Murray Berroth
Russell Fesler Coffey
John Franklin Erdley
Sivert Eriksen
Harry Bernice Hickman
Ralph Ward Hixson
Samuel Ray Johnson
Leo Alphonsus Magrath

Isaac Tennyson Mock
Winfield Jehu Ritter
Merrill Philip Schlaegel
Grover Meeker Simpson
Louis Vallieres Skidmore
Jay Erskine Stanton
Brainard Louis Taylor
Bremner Bagnall White

Division of Engineering

BACHELOR OF SCIENCE IN ARCHITECTURE

Harold Frederick Laubert

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Hugh Donald Barnes
Clyde Elwood Beckett
Albert Clarence Bux
John Francis Grady

Lloyd Rayburn Miller
Lyman Jay Rees
Lloyd William Roberts
Guy Allegre Russell

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Clarence Leland Browning
William Robert Folck
William Thornton Foreman
Ralph Emerson Franklin
Lester Frank Gfeller
Robert Albert Graves

John Spence Gulledge
Samuel Willet Honeywell
Paul Revere Lemly
Dilts Sprankle McHugh
Frank Louis Sahlmann
Martin Hayden Soule

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Paul Lowell Fetzner
George Hamilton
Claude Gustave Hansen

Clarence Charles Huycke
Clifford Howard Myers
Roscoe Noyes St. John

Division of Home Economics

BACHELOR OF SCIENCE IN HOME ECONOMICS

Genevra Mae Adams
Mable Christmas Adams
Helen Cecile Beck
Adelaide Evelyn Beedle
Ernestine Biby
Bertha Biltz
Helen Willamine Blank
Esther Bruner
Bessie Catherine Burkdoll
Phyllis Harriet Burt
Hettie Carris
Vera Cates
Catherine Aleph Christman
May Dahnke
Verla Dahnke
Bertha Lewis Danheim
Helen Josephine Dawley
Lulu Elizabeth Deist
Hazel Viola Dyer
Margaret Etzold
Mabel Evans
Agnes Eloise Flanders
Mary Abigail Furneaux
Gladys Lorena Ganshird
Marie Gehr
Bertha Elizabeth Glenn
Ruth Stephens Goodrum
Mamie Grimes
Dora Eve Grogger
Eva Maud Gwin
Mary Elizabeth Hagenbuch
Marie Hammerly
Ruth Anna Harding
Marie Ellen Haynes
Mary Jane Hill
Mary Zilpha Hitch

Helen Myrtle Johnson
Mary Catherine Johnston
Elizabeth Emily Kirkpatrick
Helen Unetta Lawrence
Carolyn Elizabeth Lear
Anne Marie Lorimer
Gladys Love
Frances Evelyn Lovett
Bessie Lenore Lyman
Josephine Alta Meldrum
Velma Mae Meserve
Adda Middleton
Nina Irene Miller
Florence Irene Mirick
Belle Moore
Eloise Morrison
Mollie Smith Moser
Edith Mabel Muir
Elinor Frances Neal
Edna Winifred Pyle
Phoebe Frances Rebstock
Ada La Vern Robertson
Cleo Prudence Roderick
Amanda Christina Rosenquist
Velda Elizabeth Stewart
Ella Belle Stinson
Josephine Sullivan
Bula Wertenberger Swim
Leona Teichgraeber
Marie Laura Thomas
Loverne Webb
Alma Luella Wilkin
Edna May Wilkin
Faye Williams
Fay Aileen Young

Division of General Science

BACHELOR OF SCIENCE

Ida Gertrude Adeo
 Nelson Joseph Anderson
 John Wendell Andrews
 John William Barker
 Mabel Rose Bentley
 Arthur Newton Burditt
 Walter Horace Burr
 Loring Ermer Burton
 Imogene Marjorie Chase
 Elizabeth Duncan Circle
 Frank Harold Collins
 Louise Dawson
 Roy Kiefner Durham
 Ina Ruth Findley
 Earle Wesley Frost

Grace Iola Gish
 Robert Stanton Hargis
 Claude Elton Hutto
 Myrtel Johnson
 Joseph Ralph LaMont
 Nellie Maria Payne
 Helen Boyd Petrie
 Arthur Cecil Ramsey
 Lenora Olive Rude
 Blanche Martha Sappenfield
 Jewell Dan Sappenfield
 Arthur Joseph Walker
 Andrew Wilbur Wilcox
 Marshall Parrish Wilder

BACHELOR OF SCIENCE IN INDUSTRIAL JOURNALISM

Cleve Somerset Briggs
 Vernon Everett Bundy
 Dora Lydia Cate
 William Kamp Charles
 Nadia Dunn Corby

Hugh Byron Dudley
 Henry Theodore Enns
 Floyd Hawkins
 Calvin Jourden Medlin

CERTIFICATES CONFERRED

CERTIFICATE IN AGRICULTURE

Walter Russell Barr
 Ronald Spencer Bentley
 Earl Manly Cook
 John Cook
 Emanuel Fromm
 Lewis Geckeler
 John Goodrum
 Theodore Earl Guss
 William Thomas Hall

Howard William Higbee
 Harvey Kelling
 Louise Krigbaum
 Emanuel Larson
 Albert Legler
 Emmet Gerherd Oltjen
 Francis Millard Outhier
 John Parrish
 Harold Ralph Stephens

CERTIFICATE IN AUTO MECHANICS' SHORT COURSE

Paul Becker
 Dean Robert Billings
 James Calvin Boner
 Walter O. Brunson
 Daniel Raymond Campbell
 Edward Jost Chapman
 Robert Stanley Coon
 Ralf Simpson Copenhaver
 Merlin Dale Corbin
 Frank M. Crawford
 Marlin D. Evans
 Herbert Gillespie Ferguson
 Lovd William Garner
 Julius Wayne Guetzmacher
 Ralph Earl Hale
 Ralph Scott Kendle
 Roy C. Kronville
 Wendell D. Kunz
 Louie Henry Kurz

Dewey Lilly
 Percy Claude Lilly
 John B. McFadden
 William Curtis Neely
 John W. Otto
 Harry Perkins
 Clarence A. Pittenger
 Russell Prescott
 Harry P. Rector
 August W. Roediger
 Homer Wesley Russell
 Fred Sachau
 Earnest Clarence Sander
 Stephen Alfred Sargent
 Irvin Earl Stark
 Leo M. States
 Ray Allen Stratford
 Joseph L. Warlen
 Charles Monroe Wehry

CERTIFICATE IN BLACKSMITHS' SHORT COURSE

Wilber E. Bjork
 William B. Porter

Harold Trott

CERTIFICATE IN CARPENTERS' SHORT COURSE

Adolph Daniel Mall

CERTIFICATE IN ELECTRICIANS' SHORT COURSE

Doyrel E. Dove
 Claude Melvin Freeman

Robert Merton Morrison

CERTIFICATE IN MACHINISTS' SHORT COURSE

Lawrence Allen Cole
 Marion Clifford Danby
 Arlie Wayne Farrar

Elwin William Niccum
 Carl Polson
 Archibald Prehn

CERTIFICATE IN TRACTOR OPERATORS' SHORT COURSE

| | |
|--------------------------|--------------------------|
| Walter Abell | Fred R. Lloyd |
| Louis M. Ballou | A. R. McAlister |
| Errol G. Barnes | Max T. McCandless |
| L. V. Baugh | Lester McIrvin |
| Howard Beetch | Arthur Eugene McLeod |
| John V. Benham | J. A. McNamee |
| Roy Blackwelder | C. Reid Machir |
| Leon Leslie Blystone | R. Dale Mark |
| P. F. Bolenbaugh | Leo Melroy |
| Walter C. Boller | Joseph Merwin |
| Earl Everett Bonesteel | J. Philip Miller |
| Clifford Brown | Lawrence C. Molzen |
| Hugh Brush | Lloyd Moore |
| C. E. Buckles | Walter E. Myers |
| Frank Burns | Eugene Neff |
| David B. Campbell | Clifford R. Olson |
| Arthur J. Christenson | Harry Perkins |
| Robert Stanley Coon | Curtis R. Peterson |
| Robert Lincoln Curtis | Frank A. Povenmire |
| Orville Darling | L. F. Quaney |
| Edwin F. Debo | R. Leonard Rassmusson |
| Bennie H. Diehl | Raymond Reece |
| William Dreyer | Willis D. Reed |
| Lester L. Elder | Clarence Rice |
| Alfred Lealand Evans | Andrew Dean Robb |
| Carl B. Field | M. F. Roberts |
| Vernett E. Fletcher | Edgar E. Rundell |
| Roy Freed | Francis C. Sanford |
| Paul Garver | Ross O. Scott |
| Robert O. Giffin | Charles D. Shaw |
| Francis J. Gorman | V. C. Sheppard |
| W. J. Gorman | John D. Smid |
| Charles Gregory | Jesse Elmer Snyder |
| Earl Grumme | Roy L. Snyder |
| Victor Albert Guerin | Vern W. Stambaugh |
| W. L. Hamilton | R. J. Sterbenz |
| Hubert H. Harman | Paul F. Stockard |
| Theodore William Howland | William Staltenberg |
| Charles Grant Hoyt | J. B. Stouffer |
| Everett Hughes | Earl Swaney |
| Ira M. Hutchison | Fred C. Teel |
| Peter Fred Jacobsen | Charley A. Thomas |
| Arthur Jevons | Leo S. Ward |
| V. E. Johnson | Guy Warren |
| Paul W. Keith | F. W. Weickert |
| John Kimple | Earle Whitney Westgate |
| Herbert Adam Kinman | Horace Wilkie |
| Fred Kinsinger | Lawrence Cooper Williams |
| Peter Knight | Lee A. Wilson |
| Louie H. Kurz | Fred Winzeler |
| L. F. Lindberg | Irvin F. Yost |

CERTIFICATE IN HOUSEKEEPERS' SHORT COURSE

| | |
|--------------------|---------------------|
| Louise Barre | Bertha Nordgren |
| Laura Berger | Bernice Oakes |
| Gertrude M. Childs | Edna Pieman |
| Bessie Cleland | Lenna Pierce |
| Sadie Diehl | Hermine A. Postier |
| Esther Harrison | LeSette Postier |
| Lavida Johnson | Martha C. Postier |
| Vesta E. Kinyon | Carrie A. Povenmire |
| Edna C. Lee | Ethel Marie Redman |
| Edrie Lohrman | India Reinhold |
| Freda Moore | Helen Rolley |
| Louise Nelson | Edna A. Swart |

CERTIFICATE IN LUNCH ROOM MANAGEMENT SHORT COURSE

| | |
|---------------|-----------------|
| Catherine Fox | Rosella Pollard |
|---------------|-----------------|

CERTIFICATE IN PUBLIC SCHOOL MUSIC

| | |
|------------------------|-----------------------|
| Gladys Bertha Graybill | Ruth Berneta Rathbone |
| Kathryn Alberta Kinman | Alice Maurine Rice |

SECOND DIVISION

DEGREES CONFERRED

Division of Agriculture

BACHELOR OF SCIENCE IN AGRICULTURE

Wesley Gordin Bruce *
 Arthur Reginald Denman *
 Walter David Gardner †
 George Gemmell †
 Reginald Robert Hinde *

David Marion Howard *
 Joseph Linn Mullen *
 Sam Joseph Smith †
 James Campbell Snapp *
 Oscar Steanson *

Division of Home Economics

BACHELOR OF SCIENCE IN HOME ECONOMICS

Mildred Jeanette Arends *
 Helen Hunt Bales *
 Margaret Sara Brown †
 Myrtle Carey *
 Sarah Alda Conrow *
 Elsie Winfield Cuthbert †
 Ethel Victoria Garrett *
 Laberta Ruth Ghormley *
 Greeta Hazel Gramse *

Alta Sarah Hepler †
 Lois Emily Litchfield †
 Lucille Carol Logan *
 Anna Leah McIntyre *
 Eliza Lucretia Scholer *
 Estella Barnum Shelley *
 Marjory Hannah Simpson *
 Edith Grace Wakefield †
 Maude Carter Woods †

Division of General Science

BACHELOR OF SCIENCE

Laura Viola Denman *
 Odessa Della Dow *

Emma Severn Whitton †

BACHELOR OF SCIENCE IN INDUSTRIAL JOURNALISM

Caroline Elizabeth Sloop *

BACHELOR OF SCIENCE IN INDUSTRIAL CHEMISTRY

Yuk En Tseu *

Division of Engineering

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Simon Edward Croyle *

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Charles Boddie Downer *

Division of Veterinary Medicine

DOCTOR OF VETERINARY MEDICINE

Frank Hare *

Hervey Phipps *

Certificate in Public-school Music

Alma Bauersfeld †

* July 30, 1920.

† September 1, 1920.

HONORS

PHI KAPPA PHI

(Class of 1920)

Division of Agriculture

Boyd Funston Agnew
Paul Levi Findley
Walter Rawlins Horlacher
Carl Lewis Howard

Gilford John Ikenberry
Arthur Leroy Myers
Luella Mabel Schaumberg
Sheppard Arthur Watson

Division of Engineering

Paul Lowell Fetzer
Diltz Sprankle McHugh

Frank Louis Sahlman

Division of General Science

Nelson Joseph Anderson
John Wendell Andrews
Roy Kiefner Durham

Nellie Maria Payne
Blanche Martha Sappenfield
Jewell Dan Sappenfield

Division of Home Economics

Bessie Catherine Burkdoll
Vera Cates
Agnes Eloise Flanders
Gladys Lorena Ganshird
Mary Jane Hill

Carolyn Elizabeth Lear
Gladys Love
Bessie Lenore Lyman
Loverne Webb

SENIOR HONORS

(May, 1920)

Division of Agriculture

Paul Levi Findley
Gilford John Ikenberry

Luella Mabel Schaumberg
Sheppard Arthur Watson

Division of Engineering

Paul Lowell Fetzer

Division of General Science

John Wendell Andrews

Blanche Martha Sappenfield

Division of Home Economics

Agnes Eloise Flanders
Mary Jane Hill

Carolyn Elizabeth Lear
Loverne Webb

Division of Veterinary Medicine

Winfield John Ritter

JUNIOR HONORS

(May, 1920)

Division of Agriculture

Ira Kaull Landon
Merton Louis Otto

Wright Edmund Turner
Ray Bates Watson

Division of Engineering

Morton Stigers

Oscar Cullen

Division of General Science

William Harry Knostman

Clementine Paddleford

Division of Home EconomicsLucile Clara Hartman
Nellie Marie HordGerda Pauline Olson
Helen Isabel Neiman**Division of Veterinary Medicine**

Thomas Gilbert Perry

List of Students

Graduate Students

Candidates for Master's Degree, 1921

- Esther Bruner, B. S. 1920 (Kansas State Agricultural College), *Biochemistry*
Manhattan
- Henry White Marston, B. S. 1919 (Delaware State College), *Animal Husbandry*
Manhattan
- Nellie Maria Payne, B. S. 1920 (Kansas State Agricultural College), *Zoölogy*
Manhattan
- Matthew George Stahl, B. S. 1920 (University of South Africa), *Agronomy*
Claremont, South Africa
- Ruth Evalyn Hurd West, B. S. 1919 (Carthage College), *Zoölogy*
Manhattan
- Roy Wilson Wampler, A. B. 1920 (McPherson College), *Chemistry*
McPherson

Graduate Students Working Toward Master's Degree

- Emily Harriet Anderson, B. S. 1919 (University of Wyoming), *Home Economics*
Laramie, Wyo.
- Alice Brooks, A. B. 1917 (University of Kansas), *English*
Peru
- Odis Herschel Burns, A. B. 1916 (University of Kansas), *General Science*
Manhattan
- Walter Burr, B. S. 1920 (Kansas State Agricultural College), *General Science*
Manhattan.
- Thomas Arthur Case, D. V. M. 1912 (Kansas State Agricultural College), *Pathology*
Sterling
- Merrill Augustus Durland, B. S. 1918 (Kansas State Agricultural College), *Engineering*
Manhattan
- Dale Ceylon Fetzer, B. S. 1920 (Oklahoma College of Agriculture and Mechanic Arts),
Animal Husbandry
Helena, Okla.
- Beatty Hope Fleenor, B. S. 1919 (Kansas State Agricultural College), *General Science*
Manhattan
- Edwin Jacob Frick, D. V. M. 1918 (Cornell University), *Veterinary Medicine*
Manhattan
- George Albert Gemmell, B. S. 1917 (Kansas State Manual Training School), B. S. 1920
(Kansas State Agricultural College), *General Science*
Manhattan
- *Frank Harold Gulick, B. S. 1920 (Kansas State Agricultural College), *Agriculture*
Winfield
- Orin Willard Hinshaw, B. S. 1919 (Kansas State Agricultural College), *General Science*
Eureka
- Walter Rawlins Horlacher, B. S. 1920 (Kansas State Agricultural College),
Animal Husbandry
Colby
- Ernest Baker Keith, B. S. 1913 (Kansas State Agricultural College), *Chemistry*
Manhattan
- Elizabeth Emily Kirkpatrick, B. S. 1920 (Kansas State Agricultural College),
Home Economics
Belleville
- Walter Leroy Latshaw, B. S. 1912 (Pennsylvania State College), *Analytic Chemistry*
Manhattan
- Russell Newton Loomis, Ph. C. 1915 (University of Colorado), B. S. 1917 (University of
Colorado), *General Science*
Manhattan
- Bess Jane McKittrick, A. B. 1912 (University of Kansas), *Home Economics*
Wilson
- David Leslie Mackintosh, B. S. 1920 (University of Minnesota), *Animal Husbandry*
Manhattan

- Mary Louise Meuser, B. S. 1917 (Kansas State Normal School), *Home Economics*
Paola
- Edith May Robinson, B. S. 1918 (Kansas State Agricultural College),
Clothing and Textiles
Atwood
- Miriam Russell Spicer, A. B. 1917 (University of Kansas), *General Science*
Lawrence
- Earl Hicks Teagarden, B. S. 1920 (Kansas State Agricultural College), *Agronomy*
Manhattan
- Ruth Kathryn Trail, B. S. 1919 (Connecticut College for Women), *Home Economics*
Groton, Conn.

Graduate Students Not Working Toward Master's Degree

- William Hiddleston Andrews, A. B. 1900 (University of Chicago), M. S. 1919 (Kansas State Agricultural College), *Mathematics*
Manhattan
- Edna Louise Beckman, B. S. 1919 (Kansas State Agricultural College), *Home Economics*
Manhattan
- Allen Park Davidson, B. S. 1914 (Kansas State Agricultural College), *Education*
Manhattan
- Howard Robert DeRose, B. S. 1918 (University of Colorado), *Chemistry*
Manhattan
- Sue Smith Hunter, B. S. 1913 (Kansas State Agricultural College), *General Science*
Manhattan
- Malcolm Cameron Sewell, B. S. 1912 (Kansas State Agricultural College), M. S. 1914
(Ohio State University), *Agriculture*
Manhattan
- Warren Robert Sheff, D. V. M. 1917 (Kansas State Agricultural College), *Agriculture*
Haven
- Wilbur Neilson Skourup, B. S. 1915 (Kansas State Agricultural College), *Chemistry*
Manhattan
- Vesta Smith, B. S. 1913 (Kansas State Agricultural College), *Home Economics*
Parsons
- Moreland Thompson, B. S. 1921 (Pennsylvania State College), *Poultry Husbandry*
Beaver, Pa.
- Yuk En Tseu, B. S. 1920 (Kansas State Agricultural College), *Chemistry*
Honolulu, Hawaii
- Edward Staunton West, A. B. 1917 (Randolph Macon College), M. S. 1920 (Kansas State Agricultural College), *Chemistry*
Manhattan

Undergraduate Students

The following list includes seniors, juniors, sophomores, freshmen and special students in College. For students in the Summer School and in special courses, see lists following this one.

Abbreviations here used denote curricula as follows: Ag, agriculture; AC, agricultural chemistry; AE, agricultural engineering; Ar, architecture; BC, biochemistry; CE, civil engineering; EE, electrical engineering; Eng., engineering; FME, flour-mill engineering; GS, general science; HE, home economics; IC, industrial chemistry; IJ, industrial journalism; M, music; ME, mechanical engineering; and VM, veterinary medicine.

SENIORS

- Gladys Virginia Addy (HE); Manhattan
 Clarence Agnew (Ag); Yates Center
 Cora Barbara Akers (HE); Windom
 Raiffe Cobb Alvord (Ag); Manhattan
 George Clarence Anderson (Ag); Bronson
 Esther Etta Andrews (HE); Manhattan
 Eva Alice Armstrong (GS); Holton
 Ardis Corinne Atkins (HE); Manhattan
 Ray Allen Axtell (Ag); Dimmitt, Tex.
 Charlotte Hosier Ayers (HE); La Harpe
 Lowell Edwin Baldwin (EE); Manhattan
 Florence Banker (HE); Lawrence
 Paul Willis Barber (GS); Dorrance
 Edgar Hugh Barger (VM); Smith Center
 *Philip Asa Barnes (Ag); Blue Mound
 Herbert Conner Barrett (Ag); Anthony
 Harold Winthrop Batchelor (GS);
 Manhattan
 Louis Bloyce Bate (VM); Wichita
 Thomas Baumgartner (Ag); Kansas City
 Ernest Leo Bebb (EE); Reading
 Joseph Alvin Bogue (VM); Manhattan
 Cecil Lloyd Bower (CE); Mound City
 Fred William Boyd (Ag); Manhattan
 Homer Conley Boyd (VM); Manhattan
 Roy Shipman Breese (EE); Manhattan
 Arthur Hayes Brewer (CE); Manhattan
 Duke Daniel Brown (Ag); Marysville
 Elsa Ann Brown (HE); Manhattan
 Guy Mahlon Brown (ME); Manhattan
 John Farr Brown (Ag); Toronto
 Gladys Elizabeth Bushong (GS);
 Manhattan
 Rex Dean Bushong (VM); Manhattan
 Samuel David Capper (Ag); Ames
 Walter Bryan Carey (GS); Hutchinson
 Zattie Otellia Carp (GS); Wichita
 Ida Pearl Carr (HE); Anthony
 Benjamin Finley Clapham (VM); Lane
 Ericile Laveta Clark (GS); Hutchinson
 Marian Cecile Clarke (GS); Paola
 Robert Earl Cleland (Ag); Alma
 Sylvan Harold Coffman (Ag); Chase
 Helen Martin Colburn (M); Manhattan
 Bessie Olive Cole (HE); Kinsley
 Arthur Bright Collom (GS); Manhattan
 Carl Marcus Conrad (AC); Burlington
 Gertrude Vivian Conroy (HE); Manhattan
 *Arthur Everett Cook (Ag); Russell
 Christine Carol Cool (HE); Manhattan
 Victor Vincent Cool (GS); Manhattan
 Robert Francis Copple (Ag); Glasco
 Nora Corbet (HE); Leona
 Marceline Willard Couture (HE); Topeka
 Everett Russell Cowell (Ag); Clay Center
 Ruby Lee Crocker (IJ); Matfield Green
 Claude Brownley Cross (Ag); Manhattan
 Kenneth Robert Crow (Ag); Manhattan
 Mary Natalie Cruzen (GS); Gallatin, Mo.
 Charles Deforest Davis (Ag); Manhattan
 Dorsie Lawrence Deniston (Ag);
 Manhattan
 Abbie Clair Dennen (HE); Manhattan
 Addison Curtiss DePuy (ME);
 Manhattan
 Walt Ellwood Dickerson (CE); Wichita
 Fred Hollister Dodge (Ag); Manhattan
 Claire Ansel Downing (IC); Wichita
 Winnie Drake (HE); Manhattan
 George Milton Drumm (Ag); Manhattan
 Mvers Duphorne (EE); Sharon Springs
 Linn Edmund Eberwein (Ag); Lawrence
 Edwin Elcock (CE); Wichita
 John Francis Ellis (Ag); Pratt
 Fred Emerson (VM); Ottawa
 Jessie Belle Evans (GS); Topeka
 Bly Ewalt (HE); Medicine Lodge
 Hobart Fairman (ME); Manhattan
 Ray Ferree (Ag); Spearville
 George Wilber Fisher (EE); Sedalia, Mo.
 Otto Franklin Fisher (ME); Manhattan
 Torby Glenn Fletcher (FME); Wichita
 Elsie Gladys Flippo (HE); Abilene
 Conie Caroline Foote (HE); Downs
 Gladys Evelyn Ford (HE); Seneca
 John Fredenburg (VM); Council Grove
 Clifford Gallagher (VM); Perth
 Oscar Deane Gardner (EE); Louisburg
 Ruth Emma Gardenhire (HE); Alma
 Isaac Frank Gatz (VM); McPherson
 David Martin Geeslin (EE);
 Arkansas City
 Henry Gilbert Gentry (Ag); Winfield
 William Hopper Getty (Ag); Downs
 Ernest Eugene Gilbert (Ar); Manhattan
 Mary Helen Gilbert (HE); Manhattan
 Samuel James Gilbert (Ag);
 Arkansas City
 Ruth Harriet Gilles (HE); Kansas City
 Howard Lewis Gingery (VM); Manhattan
 Mable Celesta Ginter (HE); Manhattan
 Irene Florence Graham (HE); Manhattan
 Chester Eugene Graves (Ag); Manhattan
 Elizabeth Greenlee (HE); Kansas City
 Hilborn Hall Groat (VM); Chase
 Clinton Guy (Ag); Kansas City, Mo.
 Fred Eugene Hall (EE); Almena.
 Marguerite Hammerly (GS); Manhattan
 Ruth Garfield Harrison (HE); Jewell City
 Lucile Clara Hartmann (HE); Hutchinson
 Ethel Porter Hatfield (GS); Wichita
 *Clyde Russell Hemphill (Ag); Chanute
 Margaret Effie Hendricks (HE); Fort
 Smith, Ark.
 Homer Henney (Ag); Horton
 Ethan Allen Herr (Ag); Manhattan
 Chester Alberm Herrick (Ag); Colony
 George Randolph Hewey (Ag); Manhattan
 Russell Dean Hilliard (EE); Westmore-
 land
 George Winfred Hinds (Ag); Pleasanton
 Lester Hoffman Hoffman (GS); Abilene
 Edna Letha Hoke (HE); Manhattan
 Dalton Ray Hooton (Ag); Manhattan
 Flora Pearl Hoots (M); Winfield
 Nellie Maria Hord (HE); Colony
 Opal Maye Horr (GS); Thayer
 John Albert Howarth (Ag); Manhattan
 Hazel Dell Howe (HE); Manhattan
 Oliver David Howells (Ar); Kansas City,
 Mo.
 Stuart Laverne Hunt (VM); Blue Rapids
 William Lewis Ikard (VM); Manhattan
 Dan Leo Jantz (AE); Larned
 Jerry Dillard Jarmon (VM); Kansas City
 Edward John Jelden (VM); Columbus, Neb.
 Hope Forrester Jenkins (EE); Kingman
 George Scott Jennings (Ag); Winfield
 Erma Leota Johnson (HE); Winfield
 Lois Tucker Jordan (HE); Manhattan
 Clifford Frederick Joss (EE); Manhattan
 Walter August Karlowski (IJ); Manhattan
 Madge Elizabeth Kasten (HE); Wichita
 Mildred Kaucher (HE); St. Joseph, Mo.
 Elithe Electa Kaull (GS); Glen Elder
 George Lowell Kelley (Ag); White Cloud
 Foley Kiang (Ag); Shanghai, China
 Fintan Oliver Killian (VM); Perryville,
 Mo.
 Harriette Louise Klaver (HE); Kingman
 Russell Vernon Knapp (ME); Norton
 Clifford Clark Kniseley (GS); Wichita
 William Harry Knostman (GS); Wamego
 Raymond Scott Knox (EE); Jetmore
 *Ernest Lester Lahr (Ag); Abilene

SENIORS—concluded.

- Ira Kaul Landon (Ag); Oklahoma City, Okla.
 Homer Waldo Larson (ME); Manhattan
 Walter Frank Law (IJ); Manhattan
 Blanche Lea (IJ); Greensburg
 Ione Elizabeth Leith (IJ); Irving
 Wesley Byron Lindsey (GS); Denton, Tex.
 Merle James Lucas (EE); Pratt
 Geta Lund (IJ); Manhattan
 Robert Henry Lush (Ag); Altamont
 Samuel Patterson Lyle (AE); Manhattan
 Grace Loomis Lyness (HE); Walnut
 Eugene Sidney Lyons (Ag); Lawrence
 Rolla Wade McCall (Ag); Brewster
 Clarence Hewitt McCandless (EE);
 Cottonwood Falls
 Ross McCausland (GS); Wichita
 Herbert William McClelland (GS);
 Manhattan
 Elmer David McCollum (Ag); Bogard, Mo.
 Dewey Zollie McCormick (Ag); Zeandale
 Ralph Reubin McFadden (Ag); Manhattan
 Franz Joseph Maas (ME); Alta Vista
 Paul Christoph Mangelsdorf (Ag);
 Atchison
 Walter Carl Marrs (EE); Bradford
 Florence Ethel Mather (HE); Manhattan
 Hilery Edwin Mather (Ag); Manhattan
 Carl Franklin Mershon (Ar); Oakley
 Albert Metz (Ag); Anthony
 Marguerite Helen Miller (HE); Salina
 Helen Amy Mitchell (HE); Salina
 *Clinton Hawthorn Morgan (Ar);
 Manhattan
 Leonard Glenco Morgan (VM); Manhattan
 Charles Francis Morris (EE); Wichita
 Luella Lucille Morris (HE); Wichita
 Mollie Morton (IJ); Ellsworth
 Dorothy Moseley (HE); Alma
 Donald Joseph Mosshart (ME);
 Manhattan
 James Herbert Moyer (Ag); Hiawatha
 Marianne Muse (HE); Manhattan
 Alice Helen Mustard (HE); Manhattan
 Anna Belle Neal (GS); Topeka
 Helen Isabel Neiman (HE); White Water
 Harry Emory Newton (Ag); Harper
 *Clell Ansel Newell (Ag); Matfield Green
 Charles Nitcher (Ag); Hardy, Neb.
 *Oscar Norby (Ag); Manhattan
 Gerda Pauline Olson (HE); Wichita
 Ruby Elizabeth Orth (GS); Manhattan
 Reeves Ayers Osborne (Ag); Burrton
 Merton Louis Otto (Ag); Riley
 Clementine Haskin Paddleford (IJ);
 Manhattan
 John Hale Parker (Ag); Ottawa
 Ellen La Verne Pennel (HE); Oregon, Mo.
 Thomas Gilbert Perry (VM); Wichita
 Orin Ross Peterson (Ag); Caney
 Harla Phillips (GS); Paola
 John Kent Pike (EE); Chanute
 Faye Marie Powell (HE); Iola
 Doris Hawthorne Prickett (HE); Wamego
 Clarence Quigley (Ag); Blaine
 Karl Spangler Quisenberry (Ag); Newton
 Velva Rader (HE); Caney
 Helen Gertrude Ramsey (HE);
 Binkelman, Neb.
 Harry DuMont Reed (Ag); Larned
 *Marion Capps Reed (GS); Manhattan
 Laurens Reyburn (Ag); Leavenworth
 Gladys Irene Ritts (HE); Topeka
 Kathryn Roderick (HE); Manhattan
 China Ethel Rogers (M); Manhattan
 Lydia Eugenia Rogers (BC); Manhattan
 Gladys De Ella Ross (HE);
 Oklahoma City, Okla.
 Marion Elizabeth Sanders (HE);
 Leavenworth
 Chauncey Elias Sawyer (VM); Carlyle
 William Robertson Schell (Ag); Wichita
 Abraham Burton Schmidt (AE); Canton
 Lee Ashton Scott (VM); Westphalia
 Myra Edna Scott (GS); Manhattan
 Flavel Theodore Scriven (EE); Lucas
 William Dennis Scully (ME); Belvue
 Marcia Ann Seeber (GS); Great Bend
 Ursula Susie Senn (HE); Lasita
 Guy Shelley (CE); Wichita
 Harry Kenneth Shideler (CE); Girard
 David Lloyd Signor (Ag); Manhattan
 Paul Louis Sites (CE); Phillipsburg
 Nathaniel Sheridan Spangler (Ag);
 Abilene
 Harold Marshall Spiker (Ag); Emporia
 George Elmer Starkey (Ag); Syracuse
 Elma Ruth Stewart (HE); Topeka
 Lillian Colene Stewart (HE);
 Hamilton, Mo.
 Warren Roy Stewart (Ag); Manhattan
 Morton Stigers (EE); Manhattan
 Charles Harold Stinson (Ag); Carlyle
 Thomas Granville Storey (EE); Wichita
 Mabel Manghild Swanson (HE);
 Manhattan
 Florence Swenson (HE); Kansas City, Mo.
 Samuel Isaac Thackrey (GS); Kansas City
 Corinne Bertha Thiele (GS); Hanover
 Everett Tunnick (VM); Tyro
 Grace Leota Turner (GS); Milton
 Wright Edmund Turner (Ag); Manhattan.
 Mary Laura Vaile (HE); Manhattan
 Louis Vinke (Ag); Columbus, Mont.
 Ray Bates Watson (Ag); Wichita
 Norine Ardeth Weddle (GS); Lindsborg
 Sara Esther Weide (HE); Yates Center
 Willard Welsh (Ag); Newton
 Ray James Weinheimer (VM); Ottawa
 Winifred West (HE); Kinsley
 Edith Marie Wheatley (GS); Rosedale
 Raymond Francis White (Ag); Winfield
 Frances Josephine Whitmire (HE);
 West Plains, Mo.
 Jennings Elliott Williams (VM); Colony
 Marion Manning Williams (VM); Muscotah
 Ruth Evelyn Willis (HE); Manhattan
 Eugene Willison (GS); Manhattan
 Paul Benjamin Winchel (EE); Osawatomie
 Cora Winget (HE); Jennings
 Edwin William Winkler (Ag); Rozel
 Elizabeth McNew Winter (HE);
 Gainesville, Tex.
 Lee Winter (GS); Lecompton
 Elsie Wolfenbarger (HE); Manhattan
 Lois Wood (HE); Emporia
 Margaret Woodman (IJ); Manhattan
 Floyd Wayne Work (ME); Windom
 Esther Wright (HE); Welsh, La.
 Phillip Young (Ag); Hangchow, China
 Susan Elizabeth Young (HE); Jewell
 Clarence Le Roy Zimmerman (EE); Olathe
 Lloyd Zimmerman (EE); Manhattan

JUNIORS

- Kathryn Ruth Adams (HE); Topeka
 *James Frederick Adeo (VM); Manhattan
 Jessie Gertrude Adeo (HE); Wells
 James Henry Albright (GS); Winfield
 Dale Allen (AE); Burlington
 Jesse Levi Allen (Ag); Norwich
 Jewell Bernice Allen (HE);
 Mountain Grove, Mo.
 Joseph Levi Allen (Ag); Leavenworth
 Nelson Henry Anderson (Ag); Neosho Falls
 Aldis Lynn Austin (Ag); Irving
 Lillian Edna Ayers (GS); La Harpe
 Vida Mildred Ayers (HE); Sabetha
 Adalia Capsey Backman (M); Manhattan
 Mildred Mae Baer (HE); Wichita
 Edgar Francis Bailey (EE); Pratt
 Harriett May Baker (GS); Emporia
 Harry Leigh Baker (Ag); Baldwin
 Marcia Helene Baker (GS); Wichita
 Marion Henry Banks (ME); Wichita
 Justus Wheeler Barger (Ag); Manhattan
 Frances Emma Batdorf (HE); Burlington
 Elmer Eugene Bates (Ag); Perry
 Burton Bernard Bayles (Ag); Manhattan
 Marjorie Marie Berger (GS); Sylvan Grove
 Joseph Ersal Beyer (EE);
 Mooreland, Okla.
 William Sheffield Blakely (Ag); Neodesha
 Norman Douglas Bloom (CE); Olathe
 Marguerite Bondurant (HE); Ness City
 Curtis Clegg Bost (Ag); Matthews, N. C.
 Walter Raymond Bradley (EE);
 Manhattan
 Marian Elizabeth Brookover (HE);
 Eureka
 Henry Lane Brown (CE); Blue Rapids
 Orville Brubaker (EE); McPherson
 Neal Dwight Bruce (Ar); Marquette
 Homer Bryson (IJ); Leon
 William John Bucklee (EE); Manhattan
 Robert Lee Bumgardner (CE);
 Arkansas City
 Holman Lynn Bunger (Ag); Manhattan
 Leslie Burger (HE); Seneca
 William Harold Burgwin (CE);
 Manhattan
 Earl Frederick Burk (Ag); Ottawa
 George Hoffman Bush (EE); Little River
 Georgiana Bush (HE); Little River
 Elvira Josephine Bussey (IJ); Centralia
 Oliver Pardee Butler (Ag); Farmington
 Lawrence William Bvers (Ar); Abilene
 Adelaide Elizabeth Carver (HE); Oakley
 Frances Casto (GS); Guymon, Okla.
 Hortense Caton (HE); Winfield
 Marian Chandler (HE); Tulsa, Okla.
 Robert Leslie Chapman (EE); Paola
 Volney Alan Chase (Ar); Manhattan
 Ray Samuel Circle (Ag); Kiowa
 Leo Melvin Clark (Ar); Chapman
 Roy Engle Clegg (Ag); Altoona
 Fred Cocherell (EE); Manhattan
 Sylvester Joy Coe (Ag); St. Augustine, Fla.
 Embert Harvey Coles (Ag); Manhattan
 Fern Geneva Coles (GS); Manhattan
 Gertrude Conn (HE); Kirbyville, Tex.
 Harry Hubert Connell (CE); Bazine
 Vincent Cool (GS); Manhattan
 Helen Lucille Cooper (HE); Manhattan
 Samuel Lynn Copeland (Ag); Hutchinson
 Bessie May Coulter (HE); Wichita
 Warren Cowell (Ag); Clay Center
 Clara Lena Cramsey (HE); Manhattan
 Georgia Belle Cribfield (HE); Manhattan
 Royce Brainerd Crimmin (AE);
 Manhattan
 Rolland Miller Crow (EE); Manhattan
 John Daniel Cunningham (GS);
 Manhattan
 Ruth Lois Cunningham (HE); Manhattan
 William Henry Curtis (EE); Ogden
 David Everett Davis (VM); Manhattan
 George Stuart Davis (CE); Clay Center
 Mary Frances Davis (GS); Bronson
 Carl Curt Dethloff (Ag); Kansas City, Mo.
 Hannah Dick (IJ); Newton
 Elizabeth Dickens (IJ); Manhattan
 Earl Ralph Domoney (EE); Downs
 Irene Dora Drake (HE); Wichita
 Margaret Dubbs (HE); Ransom
 Mary Edmona Dudley (HE); Lebanon
 Lester Arthur Dumond (GS); Holcomb
 Roy Eckart (ME); Paola
 Harold Chester Elder (AE); Mankato
 Richmond Knostman Elliott (EE);
 Manhattan
 Arnold Joseph Englund (Ag); Falun
 Victor John Englund (CE); Falun
 John Harold Epperson (CE); Hutchinson
 Clara Bernice Evans (HE); Liberal
 John Evans (Ag); Osage City
 Kenneth Clide Farley (VM); Manhattan
 Carl Field (GS); McPherson
 Howard Daniel Finch (Ag); White Water
 Glenn Findley (Ag); Manhattan
 Marjorie Fisher (GS); Manhattan
 Gertrude Evelyn Flowers (HE);
 Hastings, Neb.
 Ruth Floyd (HE); Sedan
 Joseph Patrick Flynn (EE); Palmer
 Paul Alfred Foltz (GS); Oswego
 Asa Herbert Ford (EE); Seneca
 Elsie Fulton (HE); Manhattan
 Elton Milbert Gard (GS); Stafford
 Grace Lillian Gardner (HE); Hutchinson
 Truman Olvard Garinger (Ag);
 Manhattan
 Gerald Lynn Garloch (EE); Garden City
 Ruth Reynolds Garvin (HE); Lawrence
 Glen Gates (CE); Kansas City
 William Albro Giles (Ar); Manhattan
 James Harry Gillespie (GS); Anthony
 George McGrew Glendening (EE);
 Manhattan
 Earl Francis Graves (Ag); Manhattan
 Hazel Louise Graves (HE); Manhattan
 Theodore Reed Griest (Ar); Topeka
 Leslie Howard Griswold (Ag); Rossville
 Garnet Vivian Grover (HE); Iola
 Charles Francis Hadley (Ag);
 Huntley, Ill.
 Belle Hagans (GS); Manhattan
 Mildred Josephine Halstead (HE);
 Manhattan
 Robert Leslie Hamilton (ME); Manhattan
 Jean Hanna (GS); Clay Center
 Walter Roy Harder (Ag); Minneapolis
 Jane Gladys Hartley (GS); Manhattan
 Ernest Hartman (GS); Manhattan
 Clarence Raymond Hatfield (CE);
 Wichita
 Irene Hays (GS); Manhattan
 Grace Headrick (HE); Winfield
 Herbert Benjamin Headrick (ME);
 Winfield

* Under auspices of Federal Board for Vocational Education.

JUNIORS—continued.

- Fred John Hennes (EE); Burns
 Perry Hershey (EE); White Water
 Grace Marguerite Hibarger (GS); Wichita
 Brom Dwight Hixson (Ag); Wa Keeney
 Herman George Hockman (EE); Beattie
 Ernest Eugene Hodgson (Ag); Harveyville
 Irene Frances Hoffhines (HE);
 Manhattan
 Cecil Canum Holmes (Ag); Wellington
 Kenneth Oscar Houser (EE); Wichita
 Charles Wilber Howard (IJ); Winona
 Clara Belle Howard (HE); Colby
 Mable Amanda Howard (HE); Manhattan
 Charles Harold Howe (GS); Chapman
 Eric Eugene Huff (Ag); Chapman
 May Agnes Hunter (HE); Rock Creek
 Guy Herndon James (CE); Manhattan
 Ralph St. Clair Jennings (EE); Le Roy
 Ernest Johnson (FME); Holdrege, Neb.
 Florence Marguerite Johnson (GS);
 Manhattan
 Tracy Ebbert Johntz (ME); Abilene
 Noble Lyster Jones (GS);
 Kansas City, Mo.
 *Francis Jordan (Ag); Manhattan
 Omer Karns (FME); Fort Scott
 Ray Edwin Kellogg (Ag); Wichita
 Kathleen Knittle (GS); Manhattan
 Carol Knostman (HE); Wamego
 William Harold Koenig (Ar); Nortonville
 Iva Mayra Kopp (HE); Hiawatha
 Paul Kovar (EE); Kansas City, Mo.
 Emmett Engle Kraybill (Ar); Abilene
 Herbert Hervey Krehbiel (Ag);
 Moundridge
 Maude Ella Lahr (GS); Waynoka, Okla.
 Maurice Dee Laine (IJ); Herington
 Ralph Cole Lapsley (GS); Burlington
 Wing Kei Lau (Ag); Canton, China
 Lysle Douglas Leach (Ag); Winfield
 *Aubrey McDaniel Lee (VM); Manhattan
 Vera Louise Lee (HE); Glen Elder
 Jessie Irene Lehman (GS); Newton
 Eva Bell Leland (HE); Wichita
 Ernest Lindholm (Ag); Cheney
 Will David Lobaugh (Ag); Greenleaf
 Glen Longley (CE); Lebanon
 Daniel Gail Lynch (ME); Manhattan
 Hazel Alma Lyness (HE); Walnut
 Harold Joseph McGinley (Ag); Manhattan
 Harold McKeever (Ag); Circleville
 James Alexander McKitterick (VM);
 Greenwood, Mo.
 Paul Marquois McKown (EE);
 Manhattan
 Charles Clvde McPherson (EE); Iola
 Katharin McQuillen (HE); Clay Center
 Duella Mae Mall (HE); Manhattan
 Ross Maltby (Ar); Salina
 Louise Helen Mangelsdorf (HE);
 Atchison
 Thornton Jason Manry (EE); Manhattan
 Ray Eugene Marshall (Ag); Manhattan
 William Martin (Ag); Winfield
 Rolland Sylvester Mather (Ag); Manhattan
 Ezra Perle Mauk (Ag); Hillsdale, Okla.
 Rex Maupin (Ag); Manhattan
 Orpha Maust (GS); Garden City
 Hobart Irwin May (ME); Manhattan
 Albert Vincent Mead (IJ); Manhattan
 Earl Thomas Means (Ag); Everest
 Raymond Ellsworth Means (CE);
 Protection
 Virginia Messenger (HE); Manhattan
 Florence Imogene Meyer (M); Anthony
 Bernice Ellen Miller (HE); Horton
 Edith Pearl Miller (HE); Council Grove
 Jo Marshall Miller (EE); Manhattan
 Alice Mitchell (IJ); Kansas City, Mo.
 Olivette Mitsch (M); Woodbine
 Halford Ernest Moody (Ag); Riley
 Jean Moore (HE); Nowata, Okla.
 John Morrison Moore (Ag); Stockton
 Lorin Gerald Moore (GS); Great Bend
 Raymond Hubert Moran (GS); Clafin
 Ross Davis Mowry (ME); Manhattan
 Jephtha Jerry Moxley (Ag); Osage City
 Donald Dudley Murphy (Ag); Halstead
 Guy Murray (CE); Manhattan
 Harold Smith Nay (EE); Manhattan
 Arria French Neal (HE); Clay Center
 Raymond Clyde Nichols (Ag); Buffalo
 Frank Edward Nordeen (EE); Dwight
 Guy Oden (ME); Sterling
 Hazel Lucille Olson (HE); Topeka
 Randolph Lindley Palmer (IJ); Jewell
 Helen Parker (GS); Manhattan
 Dwight Patton (Ag); Crisfield
 Amos Oliver Payne (ME); Manhattan
 Ruth Jane Peck (GS); Berryton
 Florence Utelle Persons (GS); Manhattan
 Paul John Phillips (EE); Paola
 William Dale Pierce (EE); Manhattan
 Howard Frederick Plamann (Ag);
 Fairview
 Eva Mildred Platt (HE); Manhattan
 Elizabeth Claribel Powell (HE); Topeka
 Charles Wallace Pratt (IJ); Wiggins, Miss.
 Hally Ralph Priestley (CE); Wichita
 James Wendell Pryor (ME); Kansas City
 Michael Ptacek (Ag); Emporia
 Jerry Thomas Quinn (Ag); Manhattan
 Katherine Clark Quirk (GS); Newton
 Roland Ragle (CE); Fort Scott
 Horace Malvern Randels (Ag); Anthony
 Floyd Ratts (VM); Atlanta
 George Harvey Reazin (EE); Manhattan
 Oliver Reed (Ag); Manhattan
 Walter Hosea Reed (EE); Manhattan
 Henry Irving Richards (Ag); Howard
 Hazel Lucille Reynolds (HE); Horton
 Nita Jones Richardson (HE); Wynne
 Wood, Okla.
 Carson Basil Roberts (Ag); Manhattan
 Gail Catheryn Roderick (HE); Attica
 Walter John Rogers (FME); Quinter
 Walter Thomas Rolfe (Ar); Wetmore
 *Paul McKinley Roote (IC); Eskridge
 Lee Rossel (EE); Meade
 Thomas Rothrock (GS); Springdale, Ark.
 William Spencer Ruggles (CE); Emporia
 Dorothy Katharine Ryherd (GS); Horton
 Morse Henderson Salisbury (IJ); Atchison
 Eugene Saxton Scott (Ag); Burlington
 Robert Graham Scott (CE); Kansas City,
 Mo.
 James Jacob Seright (EE); Colby
 Dorothy David Settle (HE); Wynne Wood,
 Okla.
 Gerald Clair Sharp (Ag); De Witt, Neb.
 Clare Liggett Shellenberger (Ag);
 Manhattan
 Luella Pearl Sherman (HE); Grinnell
 Mae Short (ME); Salina
 Ross Jacob Silkett (Ag); Downs
 Leland Otis Sinderson (EE); Manhattan
 Clara Mary Smith (HE); Mound City, Mo.
 Edna Marie Smith (HE); Ford City, Mo.
 George Sherman Smith (ME);
 Independence
 Linus Burr Smith (Ar); Hutchinson
 Marion Ashton Smith (Ag); Topeka
 Ernest Floyd Stalcup (ME); Hutchinson

* Under auspices of Federal Board for Vocational Education.

JUNIORS—concluded.

- Vern Washington Stambaugh (AE); Maplehill
 Jay Ralph Starkey (VM); Manhattan
 Florence Stauffer (HE); Marion
 James Scott Stewart (Ag); Coldwater
 Henry Clinton Sturgeon (Ag); Lane
 Frank Arvid Swanson (Ag); Manhattan
 Eugene Rupert Sweet (Ag); Manhattan
 Harold Irwin Tarpley (EE); Kansas City
 Gladys Eleanor Taylor (HE); Chapman
 Helen Thayer (GS); Manhattan
 Earl Emery Thomas (EE); Argonia
 Rowena Malinda Thornburg (GS); Formoso
 Eva Lucile Travis (HE); Manhattan
 Rowena Turner (HE); Chanute
 Carl Francis Uhlrich (Ag); Wamego
 Susie Unruh (GS); Pawnee Rock
 Hobart Scott Van Blarcom (GS); Kansas City, Mo.
 Eva Grace Van Scoik (HE); Aulne
 John Waldo Van Vliet (VM); Manhattan
 Eugene Haley Walker (Ag); Manhattan
 *Rees Conway Warren (ME); Teckla, Wyo.
 Millard Cummings Watkins (EE); Clay Center
 Sibyl June Marie Watts (HE); Winfield
 Esther Waugh (HE); Amherst, Mass.
 William Wallace Weaver (GS); Gravette, Ark.
 Arthur Weber (Ag); Horton
 Marion Welch (HE); Emporia
 Lucile Whan (IJ); Manhattan
 Vorin Edwin Whan (GS); Manhattan
 Lawrence Whearty (CE); Westmoreland
 Herbert Lawrence Wilkins (GS); Manhattan
 Claude Merlin Willhoite (Ag); Paola
 Fred Woods Williams (VM); Hunter
 Roy Williams (Ag); Manhattan
 Everett Hoover Willis (Ag); Manhattan
 Lois Marie Willson (HE); Rock Springs, Wyo.
 Charles Trago Wilson (Ar); Little River
 Eva Bee Wilson (BC); Wichita
 John Cathcart Wilson (GS); Manhattan
 *Murray Alderson Wilson (CE); Baldwin
 William Clyde Wilson (Ag); Manhattan
 Jesse Collins Wingfield (Ag); Junction City
 Milton Shipman Winter (Ag); Leecompton
 Dewey Earl Wolgast (GS); Alta Vista
 Robert Wolnick (ME); Blair
 Hubert Earl Woodring (EE); Manhattan
 Mabel Lucile Worster (HE); Manhattan
 Clemens Harry Young (Ag); Manhattan
 Lulu May Zeller (IJ); Manhattan
 John Williamson Ziegler (Ag); Lansdowne, Pa.
 Charles Zimmerman (ME); Manhattan

SOPHOMORES

- Edith Dorothy Abbott (IJ); Morehead
 Ramona Abrams (IJ); Arkansas City
 *Jasper Dorman Adams (Ag); Darlington, Mo.
 Warner Adams (Ag); Maple Hill
 Neal Dow Alleman (ME); Kansas City.
 Thomas Henry Allen (CE); Colwich
 Leonard Rhys Allott (Ag); Pueblo, Colo.
 Howard Albert Ames (Ag); Downs
 Maurine Esther Ames (HE); Moline
 Arthur Alfred Anderson (EE); Meridan
 Delmar Collins Anderson (CE); Phillipsburg
 Eunice Miriam Anderson (M); Phillipsburg
 Lucile Eugenia Anderson (HE); Lindsborg
 Violet Anna Andre (HE); Horton
 Frank Minton Angus (ME); Sterling
 Margaret Pearl Ansdell (HE); Jamestown
 Paul McKee Anthony (EE); Westmoreland
 Clifford Leland Antle (EE); Emporia
 Emmons Leslie Arnold (CE); Marysville
 Leola Elnore Ash (HE); Manhattan
 Marjorie Ault (HE); Manhattan
 *Elmer Rex Ausemus (Ag); Cherokee
 Oscar Hugh Aydelotte (EE); Manhattan
 Agnes Mary Ayers (HE); La Harpe
 Marvin Bahl (Ag); Pleasanton
 Ralph Waldo Baird (AE); Topeka
 Harold Theodore Baker (AE); Tonganoxie
 Meta Jeannette Baker (HE); Rogers, Ark.
 Herbert Bales (Ag); Manhattan
 Margaret Bane (HE); Liberal
 Edna Florence Bangs (GS); Madison
 Fred Bangs (Ag); Madison
 Galen Andrew Barber (EE); Dorrance
 Nora Elizabeth Bare (HE); Protection
 Atwell Stewart Barkley (Ag); St. Joseph, Mo.
 Reuel Vernon Barrington (Ag); Sedan
 Neva Neola Barrows (M); Manhattan
 Laurence Floyd Barth (Ag); Manhattan
 Nelson Suplee Barth (IJ); Manhattan
 Clyde Marion Baughman (Ag); Mulvane
 Theodore Lawrence Bayer (IJ); Louistown, Mont.
 Lloyd James Beardsley (Ag); Russell
 Claude Oran Beckett (ME); El Dorado
 Douglas Clifford Beeler (Ag); Manhattan
 Ralph William Bell (EE); Kinsley
 Winifred Margaret Bell (HE); Kinsley
 Joseph Bellomy (AE); Manhattan
 Edith Elenora Bengtson (HE); Salina
 Dudley Francis Bentley (Ag); Sterling
 Sarah Edith Benton (HE); Attica
 Anna Lillian Best (HE); Manhattan
 Hattie Betz (GS); Asherville
 Mary Betz (HE); Asherville
 Perry Betz (IJ); Asherville
 Raymond Walstein Binford (CE); El Dorado
 James Joshua Black (VM); Carterville, Mo.
 William Wayne Blackhall (Ag); Sterling
 Victor Raymond Blackledge (IJ); Junction City
 Helen Ann Blair (HE); Mulvane
 Werner Jesse Blanchard (ME); Manhattan
 Robert Blanks (CE); Emmett
 Roy Eugene Boroff (EE); Manhattan
 Mary Lopp Braddock (HE); Spearville
 Earl Huff Bradley (CE); Winfield
 Maurice Bradley (CE); Winfield
 Chester Leon Bradshaw (EE); Altoona
 Velma Fairy Bradshaw (HE); Sedgwick
 Sadie Brainard (HE); Whitewater
 Carl Alfred Brandley (VM); Manhattan
 William Elwood Brandt (ME); Culver
 *Albert Lorraine Bridenstine (Ag); Marienthal
 Ernest Albert Briscoe (Ag); Latham
 Awilda Brown (HE); Winfield
 Eleanor Mary Brown (HE); Holton (deceased)

* Under auspices of Federal Board for Vocational Education.

SOPHOMORES—continued.

- Nina Myrtle Browning (HE); Manhattan
 Clarence Wilson Brownlee (AE); Stafford
 Michael Joseph Brull (CE); Everest
 (deceased)
 Lewis Jay Bryan (EE); Manhattan
 Grace Wilamine Buchheim (HE);
 Leonardville
 Carey Allan Bunker (EE); Oregon, Mo.
 Hazel Effie Burdette (HE); Severy
 Emily Burger (HE); Seneca
 Bertha Anna Burk (HE); Clifton
 Carl Eldon Burke (EE); Solomon
 Harris Loree Burnett (IC); Dodge City
 Osceola Hall Burr (GS); Manhattan
 George Harold Burroughs (ME);
 Manhattan
 Esther Eleanor Burt (GS); Eureka
 *Hiram Gilbert Burt (Ag); Garden City
 Mabel Foster Burt (HE); Garden City
 Claude Raymond Butcher (Ar); Solomon
 Bertha Viola Bulter (HE); Arkansas City
 Elgin Roy Button (Ag); Topeka
 Leta Bybee (HE); Garnett
 Alice Barbara Campbell (HE); Mulvane
 Jessie Campbell (HE); Attica
 George Dale Carson (CE); Manhattan
 Paul Bryan Carson (VM); Liberal
 Audrey Byron Carter (GS); Eskridge
 Kenneth Carter (IJ); Mound City, Mo.
 Ivy Hildreth Case (M); Alta Vista
 *Sylvester Utric Case (Ag); Lyons
 Chester Benjamin Chambers (GS);
 Quenemo
 Penn Samuel Chambers (GS); Quenemo
 Earl Ambrose Chappell (GS); Norton
 Ralph Emerson Chase (IC); Severy
 Louis Edward Childers (IJ); Wamego
 Kay Iverson Church (EE); Haddam
 Dorothy Zella Churchward (HE);
 Wichita
 Wallace Jerome Clapp (GS); Logan
 Malcolm Jerome Clark (Ag);
 Lascar, Colo.
 Marjorie Edith Cole (HE); Kinsley
 Theodore Dennis Cole (Ag); Arlington
 Wilber Doane Cole (CE); Topeka
 Inez Alice Coleman (HE); Manhattan
 Myrtle Irene Coleman (GS); Centralia
 Nellie Jane Coleman (HE); Manhattan
 *Hubert Lee Collins (Ag); Wellsville
 Evelyn Marilda Colwell (HE); Manhattan
 *Howard Loyd Comfort (Ag); Topeka
 Mae Connery (HE); Sterling
 Irene Margaret Conroy (HE); Manhattan
 Thomas Alfred Constable (ME);
 Minneapolis
 Merl Stanley Cook (AE); Dillon
 Merriam Elinor Cook (EE); Bucklin
 Charles James Coon (VM); Manhattan
 *Edward Harry Cooper (EE); Fort Scott
 Donald Corby (EE); Manhattan
 Orville Robinson Cragun (GS); Kingman
 Frank Wright Crawford (VM); Manhattan
 Harold Lee Crawford (Ag); Paola
 Scott Daugherty Criswell (Ag);
 Manhattan
 Paul Clarence Cross (EE); Wichita
 Thomas Cross (Ag); Belle Plaine
 Reba Cullum (HE); Chanute
 Purl Hughie Cunningham (EE); Girard
 Esther Curtis (HE); Kansas City
 Leslie Clifford Curtis (CE); Englewood
 *Charles Otto Dailey (EE); Garden City
 Dora Dean Dakin (GS); Ashland
 Osie Faye Daniels (GS); Carman, Neb.
 Earl Gilbert Darby (ME); Manhattan
 Mary Booth Davidson (HE); Yates Center
 Cyrus Calvin Davidson (EE);
 Yates Center
 Thelma Lucile Davis (HE); Council Grove
 Lewis Brown Deal (ME); Newton
 John Alfred Deardorff (Ag); Lyndon
 Orville Marshall Deibler (EE);
 Manhattan
 Elmer Frank Deshazer (CE); Merriam
 Alice Louise DeWitt (GS);
 Medicine Lodge
 Nathan Eskridge Divilbiss (Ag); Olathe
 Thelma Marie Dobson (M); Winfield
 Lloyd Harold Downing (EE); Colwich
 Lester Henry Drayer (ME); Manhattan
 Myrtle Sadie Dubbs (HE); Ransom
 *Kent Ruggles Dudley (VM); Carlisle
 Clair Eber Dunbar (Ag); Columbus
 *Noel Nardin Dunbar (Ag); Columbus
 Wayne Elbert Dunham (ME); Little River
 Jack Wilbur Dunlap (Ag); Scott City
 Frank Leslie Dyer (GS); Culver
 Wilma Finley Eaton (GS); Highland
 Charles Sylvester Ebenstein (EE);
 Manhattan
 *Sidney Peter Eberhart (CE); Topeka
 James William Eby (CE); Medicine Lodge
 George Graham Edgerton (EE); Canton
 Virginia Gladys Elder (HE); Douglas
 Dorothy Jane Ellis (HE); Pratt
 Frederick Earl Emery (VM); Baldwin
 Foster Noel Emmons (Ag); Manhattan
 John Hubert English (Ar); Wichita
 Lester Edgar Erwin (Ag); Manhattan
 *Paul Evans (Ag); Williamstown
 Junius Warren Farmer (Ag);
 St. Joseph, Mo.
 Willis Lee Farmer (CE); Kingfisher, Okla.
 Harry John Fearey (AE); Anness
 David Morgan Feese (CE); Manhattan
 Floyd Lee Firebaugh (Ag); St. John
 Roy Lewis Fleming (Ag); Paola
 Lloyd Fletcher (Ar); Ellis
 Daniel Bishop Fogle (GS); Williamsburg
 *Timothy Foley (VM); Chapman
 Faval Lorenzo Foval (GS); Wichita
 Karl Frank (EE); Manhattan
 John Edward Franz (GS); Manhattan
 Annys Elizabeth Fraser (M); Manhattan
 Herbert Sawyer French (ME); Corpus
 Christi, Tex.
 Minnie Grace Frey (HE); Manhattan
 Francis Glenn Fry (EE); Prairie View,
 Tex.
 Otis Frederic Fulhage (EE); Yates Center
 John Silver Fuller (CE); Winfield
 Ada Elizabeth Fullinwider (HE);
 El Dorado
 Willard Clarence Fulton (Ag); Harper
 *John Clarence Gard (CE); Manhattan
 Raymond Floyd Gard (GS); Stafford
 Frederick Augustus Gardner (CE);
 Louisburg
 Hazel Irene Gardner (HE); Hutchinson
 Harold Paul Gaston (Ag); Pratt
 Eugene Lewis Geiger (Ag); Ottawa
 *Jesse Conrad Geiger (CE); Wichita
 Clarence Raymond George (Ag);
 Manhattan
 Mary Grace Gerkin (M); Riley
 Millard Reubin Getty (Ag); Waco, Neb.
 Gladys Lee Gilbreath (M); Arkansas City
 Florence Mae Giles (HE); Garden City
 Frank Arthur Gillespie (EE); Garden City
 Margaret Gillett (HE); Junction City

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SOPHOMORES—continued.

- Gordan Webb Gilman (EE); Council Grove
 Miriam Genevieve Glass (HE); Springdale, Ark.
 Dewey Aaron Goerke (Ag); Sterling
 Merle Elmer Goff (Ag); Manhattan
 Arthur Ernest Goodwin (IJ); Concordia
 *Clarence Raymond Gottschall (ME);
 Manhattan
 Lucille Alma Gramse (HE); Perry
 Lloyd George Grandfield (VM); Maize
 *Richard Bernard Griffenhagen (VM);
 Colorado Springs, Colo.
 Lawrence Evan Griffith (GS); Manhattan
 Carl David Gross (AE); Russell
 LaMotte Grover (CE); Salina
 Edith Gay Grundmeier (HE); Manhattan
 Augustus Wilkes Gudge (ME); Wichita
 Lola Leone Gudge (GS); Wichita
 Ernest Hugh Guyer (GS); Protection
 Florence Antonette Haack (HE); Florence
 Ray Dryer Hahn (Ag); Clay Center
 Edith Margaret Haines (IJ); Manhattan
 Robb Augustus Hake (ME);
 Kansas City, Mo.
 Harry Herbert Halbower (IC); Anthony
 Lawrence Hall (Ag); Manhattan
 *William Haney (EE); Lawrence
 Bess Hansen (IJ); Manhattan
 Marian Hardman (GS); Downs
 Lillis Winnette Harkey (HE); Fort Scott
 Edward Eugene Harnden (VM);
 Manhattan
 John Elbridge Harner (EE); Keats
 Queenie Esther Hart (GS); Minneapolis
 Richard Michael Hartigan (EE);
 Fairbury, Neb.
 *Hugh Enos Hartman (EE); Manhattan
 Irwin Lloyd Hathaway (Ag); Manhattan
 Margaret Ann Bertha Hawbaker (M);
 Neosho, Mo.
 Margaret Mary Hawkinson (HE); Clyde
 Bernice Elma Hedge (M); Norton
 Terrence Otis Hedrick (CE); Kansas City
 Loren Bryce Hefling (ME); Manhattan
 Beulah Frances Helstrom (HE);
 McPherson
 Elfrieda Hemker (GS); Great Bend
 Herbert Fred Hemker (ME); Great Bend
 Josephine Frances Hemphill (IJ);
 Clay Center
 Joseph Hendrix (CE); Lane
 Florence Anna Henney (HE); Horton
 Merle Revere Henre (EE); Kansas City
 *Emra Adam Hepler (Ag); Manhattan
 Susan Grace Herr (HE); Medicine Lodge
 Lydia Emma Hessel (GS); Kearney, Mo.
 Alfred Heusner (GS); Salina
 Jack Hill (Ag); Lecompton
 Marie Flora Hill (IJ); Manhattan
 Hazel Stites Hinds (HE); Rogers, Ark.
 Harold William Hoffhines (EE);
 Manhattan
 Paul Frederick Hoffman (IC); Manhattan
 John Henry Hofmann (CE); Manhattan
 Emil Hokanson (CE); Marquette
 Bernice Avis Hoke (HE); Manhattan
 Martha Margaret Holl (HE); Topeka
 Glenn Henry Hollister (CE); Wabaunsee
 Orval Everett Holzer (EE); Girard
 Frank Hoover (CE); Downs
 *Harold Dunbar Hopkins (EE); Udall
 Elmer Hopp (FME); Manhattan
 *Richard Hopper (CE); Manhattan
 Katherine Margaret Horner (HE); Longton
 George Horney (ME); Medicine Lodge
 Francis Houlton (Ag); Florence
 Frank Whitson Houston (Ag);
 Twin Falls, Idaho
 Agnes Howard (HE); Colby
 Angie Howard (HE); Colby
 Harvey Earl Howard (Ar); Manhattan
 Esther Alden Huling (HE); Manhattan
 Ray Clement Hume (EE); Humboldt
 Mae Amelia Humphrey (HE); Manhattan
 Loyall Virgil Hunt (Ag); Wilmore
 Herman Thompson Hunter (Ar); Eureka
 George Dewey Huston (VM); Manhattan
 Bion Shepard Hutchins (ME); Mont Ida
 Sarah Belle Hyde (HE); Altoona
 Donald Bryan Iback (Ag); Arkansas City
 Charles Frank Irwin (CE); Le Roy
 Fred Irwin (Ag); Manhattan
 Earl Harmon Jackson (Ag);
 Fillmore, Cal.
 James Felix Jackson (ME); Kansas City
 Mattie Christine Jackson (HE);
 Kansas City
 Gard Thomas James (Ag); Lane
 Robert Doah Jenkins (EE); Kinsley
 Alice Marie Jennings (HE); Zeandale
 George Arthur Jennings (EE); Girard
 Lester Eugene Jennings (EE); Zeandale
 Charles Louis Jobe (EE); Sedan
 Anna May Johnson (HE); Manhattan
 Elsie Vera Johnson (M); Latimer
 Ethel Augusta Johnson (HE); Marquette
 James Frank Johnson (Ar); La Crosse
 Louis George Johnson (ME); Manhattan
 Mamie Bertina Johnson (HE); Manhattan
 Frances Allegra Johnstone (IJ);
 Manhattan
 Harold William Johnston (ME); Kipp
 Clifford Charles Jolley (EE); Manhattan
 Hazel Azalia Jordan (HE); Lamar, Colo.
 Marian Jordan (HE); Manhattan
 Nellie Rose Jorns (HE); Preston
 George Harold Joy (FME); Salina
 Frances Bell Kahle (HE);
 Bartlesville, Okla.
 Annette Helen Kanzer (HE); Hutchinson
 Harlan Kapka (Ag); Kansas City
 Henry Daniel Karns (Ag); Ada
 Bert Emerson Keirns (GS); Downs
 Eugene Edward Kelly (GS); Wichita
 Mary Frances Kelly (HE); Bucyrus
 Marie Colman Kent (HE); Franklin, Neb.
 Frank Willard Kerns (Ag); Baldwin
 Lyman James Kerr (Ag); Ozark, Mo.
 William Crawford Kerr (Ar); Manhattan
 Sara Blanche Kershaw (HE); Garrison
 Leland Alfred Kettering (EE); Salina
 Jacob Acil Kibler (CE); Sedan
 Ray Stanley Kibler (EE); Sedan
 Jordan Carroll King (GS); Manhattan
 Julia King (IJ); Manhattan
 Frank Charles Kingsley (AE); Formoso
 Oscar Edward Kinhead (Ag); Troy
 Glenn Benson Kirkwood (VM); Marysville
 Irvin Bernell Kirkwood (CE); Marysville
 Forrest William Kitch (Ag); Nekoma
 Ruth Kathryn Kittell (HE); McPherson
 Ila Thelma Knight (HE); Jamestown
 Louis Myers Knight (Ag); Medicine Lodge
 Elsie Agnes Knox (M); Leon
 Zella Kouns (HE); Fowler, Colo.
 Charles Glenn Kuykendall (AE);
 Twin Falls, Idaho
 Ruth Esther Lambertson (M); Fairview
 Frank Larnier (CE); Oskaloosa
 Helen Pauline Larson (GS); Manhattan
 Elden Emanuel Leasure (VM); Solomon
 Cassie Lee Ledrick (HE); Tampa, Tex.
 Thomas William Lee (EE); Yates Center
 Rosecoe Charles Leeper (Ag); Harper
 William Werner Leeper (ME); Goff

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SOPHOMORES—continued.

Ingovar Syble Leighton (HE); Wichita
 LeRoy Markle Leiter (CE); Protection
 Amy Louise Lemert (GS); Cedar Vale
 Millicent Ailene Lemons (M); Ashland
 Willis Lloyd Leshner (CE); Dodge City
 Dale Baker Levi (CE); Manhattan
 Reuben Carl Lind (Ag); Zeandale
 Frank Bertrand Linn (Ag); Manhattan
 Ching Sheng Lo (VM); Canton, China
 Charles Dewey Logan (CE); Manhattan
 Floyd LeRoy Longwell (CE); Liberal
 Robert Siegrist Love (CE); Manhattan
 Ruby Mary Lucas (HE); Emporia
 Kai Lum Lung (Ag); Canton, China
 Percy Howard McCandless (Ag); Natoma
 Ruth Eleanor McCandless (HE); St. John
 Paul James McConnell (GS); Manhattan
 Eugene Emerson McCracken (CE);
 Manhattan
 Lawrence Dewey McDonald (ME); Parsons
 Clyde Raymond McDougal (ME); Lane
 Frederick McClay McElhinney (EE);
 Manhattan
 *Howard Hutcheson McGee (Ag); Olathe
 Andrew James McKee (VM); Manhattan
 Maurine McLachlin (M); Paola
 Helen Esther McStay (GS); Downs
 Reuben Cleo Maddy (EE); Utica
 Mary Ellen Maroney (HE); Manhattan
 Gerald Clay Marrs (ME); Bradford
 *Lester Marsh (CE); Independence, Mo.
 James Fletcher Marshall (CE); Grenola
 Sarah Margaret Mason (HE); Belle Plaine
 William Joseph Matthias (Ag); Perry
 Anabel Irene Maughlin (HE); Sylvia
 John Chester Maurer (Ag); Cambridge
 Lester Hounell Means (EE); Everest
 Lloyd Earl Means (EE); Kansas City
 Dorothy Mebus (HE); Kansas City
 Lelia Mabel Meeker (HE); Waldo
 Eva Rebecca Mellenbruch (M); Hiawatha
 George Albert Meyer (EE); La Crosse
 Franklin Henry Miller (Ag); Hutchinson
 Keith Walter Miller (EE); Portis
 Edgar Louis Misegades (EE); Peru
 Helen Margaret Mitchell (HE); Topeka
 Byron Christian Mohrbacher (EE);
 Manhattan
 Esther Ann Moore (HE); Protection
 Nellie Dale Moore (HE); Protection
 James Richard Moreland (Ag); Manhattan
 Della May Morris (HE); Clements
 George DeVore Morris (ME); Manhattan
 Justine St. Leger Mosse (GS);
 Leavenworth
 Johannes Frederick Theobald Mostert (Ag);
 Balfour, South Africa
 Louisa Salome Mover (HE); Hiawatha
 Alice Martha Mueldener (IJ); Lyons
 Edward John Mueller (CE); Washington
 Elizabeth Munson (GS); Atchison
 Mabel Ardis Murphy (M); Nickerson
 *Harry Albert Myers (Ag); Americus
 Vincent Werner Nass (EE); Atchison
 Jesse Harold Neal (AE); Williamsburg
 Eugene Frank Nelson (JE); Junction City
 Harry Nelson (CE); Bennington
 Lestle Wilber Newcomer (CE); Alexander
 Iella Belle Newkirk (HE); Geneseo
 Henry Jefferson Newton (ME);
 Bellville, Tex.
 Edith Berenice Nonken (HE); Burns
 Lillian Belle O'Brien (IJ); Manhattan
 Alpha Irene O'Neil (HE); Paola
 Elver Wayne Osbourn (CE); Randolph

Ruth Lucile Owens (M); Oxford
 Alfred Robb Paden (Ag); Clay Center
 Merl Lee Padgett (Ar); Manhattan
 Mae Louise Pagels (HE); Goodland
 Cecile Beatrice Paine (HE); Admire
 Lee Marvin Parrish (Ag); Derby
 Mildred Lorene Pence (GS); Dunavant
 Loyd McFeaters Perkins (EE); Olathe
 Ralph Henry Peters (EE); Manhattan
 Nettie Josephine Pfaff (HE); Beloit
 Ralph Kendrick Pfremmer (EE);
 Baxter Springs
 Walter Edgar Pfundstein (EE); Chanute
 Phil Delbert Piatt (Ag); Hamilton
 Don Homer Pickrell (ME); Leon
 Norman Vincent Platner (ME); Ellis
 Earle Lewis Preston (EE); Gorham
 Helen Jeanette Priestley (HE);

Kansas City

Ruby Elizabeth Pruitt (HE); Goddard
 Helen Louise Rabe (HE); Axtell
 George Joseph Raleigh (Ag); Clyde
 Ruth Rachael Rannels (HE); Manhattan
 Harry Elijah Ratcliff (Ag); Gaylord
 Robert Smith Rath (GS); Agenda
 Gordan Redman (Ar); Kansas City
 Leona Maxine Reed (HE); Ottawa
 Louise Eilene Reed (HE); Ottawa
 Thomas Bernard Reed (CE); Glasco
 Roger Eli Regnier (Ag); Wamego
 Margaret Reich (IJ); Glen Elder
 Sarah Hazel Richards (HE); Howard
 Ralph Burton Rickles (Ag); Troy
 Ruby Anna Rickles (HE); Troy
 Ivan Harris Riley (Ar); Newton
 Glenn Alvin Rixon (Ag); St. John
 Denton Oliver Roberts (Ag); St. John
 Anna Marguerite Robinson (HE);

Florence

Mott Luther Robinson (Ag); Lowemont
 Nelle Robinson (M); Wakefield
 Gladys India Roderick (HE); Attica
 Shirley Nugent Rogers (GS); Manhattan
 Lillian Foster Rommel (GS); Waterville
 Paul Gibbons Rooft (Ag); Spring Hill
 Renna Regina Rosenthal (HE); Topeka
 Glenn Lyonel Rucker (EE); Burdette
 Gretchen Rugh (HE); Abilene
 Charles Guy Russell (Ag); La Crosse
 Edith Elva Russell (HE); Paola
 Edna Blanche Russell (HE); Manhattan
 Fred Forsythe Russell (Ag); Paola
 Laura Faye Russell (M); Manhattan
 Grace Elvena Sachau (HE); Manhattan
 Robert McCollon Sallee (ME); Marion
 Dorsey Aldren Sanders (VM);
 Richburg, S. C.
 Lois Lucia Sargent (HE); Manhattan
 William Sartorius (ME); Garden City
 Christine Halene Saunders (HE);
 Manhattan
 Ira Ferdinand Schindler (GS);
 Valley Falls
 Henry William Schmitz (Ag); Alma
 Eben Ellsworth Scholer (CE); Milo
 Grace Aurora Schwandt (HE); Manhattan
 Dale Schwartz (Ag); Winkler
 Madge Marian Scott (HE); Kansas City
 Susie Scott (HE); Madisonville, Ky.
 Richard Maurice Sears (Ag); Eureka
 Don Seaton (Ag); Waterville
 Harold Leon Sebring (Ar); Gardner
 Opal Sarah Seiber (GS); Great Bend
 Randall Joel Shaw (CE); Medicine Lodge
 Helen Irma Shellhaas (GS); Abilene

SOPHOMORES—concluded.

- Francis Marlin Sherwood (ME); Grenola
 Frank Howard Shirck (Ag); Waterville
 Margaret Evelyn Shrader (HE);
 Cedar Vale
 Mae Blanche Siefkin (GS); Wichita
 Viola Marguerite Simpson (M); Herington
 Wesley Earl Simpson (Ag); Welda
 Percy Sims (Ag); Little River
 Deal Six (Ag); Versailles, Ill.
 Harry Edwin Skoog (Ag); Corbin
 Bernice Mary Slane (HE); Parsons
 Jeanette Alice Sleeper (HE); Clay Center
 Charles Randolph Smith (IJ); Herington
 Herbet Clayton Smith (Ag); Longton
 Lucile Evelyn Smith (HE); Topeka
 Rollin James Smith (CE); Topeka
 Sarah Frances Smith (HE); Durham
 Stephen Ray Smith (CE); Manhattan
 Thelma Enid Smith (GS); Manhattan
 Verna Elizabeth Smith (HE); Manhattan
 William Donald Smith (IC); Hutchinson
 Vivian Melancthon Solt (ME); Manhattan
 Adah Joan Songer (GS); Manhattan
 Bernice Merle Spence (M); Hanover
 Harold Crane Spencer (IJ); La Harpe
 Katherine Pearl Spiker (HE); Emporia
 Robert Cleveland Spratt (CE); Kansas City
 Harry John Staib (EE); Turon
 Lucy Kurtz Stallings (Ag); Morrilton, Ark.
 Florence Margaret Stebbins (GS); Ellis
 John Steiner (GS); White Water
 Hazel Fern Stewart (HE); Sedgwick
 Teddie Roosevelt Stickel (Ag); Padonia
 Fred Carl Stockebrand (Ag); Yates Center
 Glenn Dale Stockwell (Ag); Larned
 William Harvey Stotts (Ag); Minneapolis
 Carl Robert Stout (ME); Kansas City
 Clark Oliver Stratford (CE); El Dorado
 Wilma Sutton (HE); Kingman
 Abbie Swafford (HE); Manhattan
 Lynn Darling Swisher (GS); Lyndon
 Elbridge Webster Symms (ME);
 Ingersoll, Okla.
 Frances Ione Taylor (HE); Chapman
 George Ellis Taylor (VM); Hiawatha
 John Frederick Tessoroff (Ag); Onaga
 Paul Arden Tharp (CE); Winfield
 Harold Hetherington Theiss (EE);
 Hutchinson
 Adolphus Johnson Thomas (GS);
 Silver Lake
 Ruby Thomas (HE); Argonia
 Josephine Thorn (GS); Beattie
 Meryl Ethelyn Thornburg (HE); Manhattan
 Mildred Hazel Thornburg (M); Manhattan
 Fern Marie Thornton (HE); Fairbury, Neb.
 William Charles Thruston (CE);
 Kansas City
 Leona Esther Thurow (HE); Macksville
 Sallie Louise Toler (HE); Anthony
 Orval Welton Tripp (CE); Waldo
 George Edward Troup (M); Lincoln
 Lorna Doone Troup (GS); Abilene
 *Floyd Jacob Tucker (ME); Minneola
 Paul Tupper (Ag); Lecompton
 Daniel Overton Turner (Ag); Milton
 Mary Elizabeth Turner (HE); Waterville
 Joseph George Tustison (EE); Yates Center
 Marjorie Uhley (GS); Fairbury, Neb.
 Wilma Updegraff (GS); Maplehill
 James Lowell Van Gilder (Ag);
 Manhattan
 Mabel Van Tries (HE); Wellsville
 Henriette Veeh (HE); Speed
 Lola Beatrice Vincent (HE);
 Amarilla, Tex.
 Mabel Irene Vincent (GS); Sterling
 George Ellsworth Voiles (CE); Manhattan
 Emil von Riesen (CE); Marysville
 Walter Henry von Trebra (Ag); Oswego
 Ira Nelson Vowel (Ag); Anness
 Esther Lee Waddell (GS); Alexander
 Florence Elizabeth Waits (HE);
 Cassoday
 Frank Edwards Walbridge (EE);
 Kansas City, Mo.
 Martha Winifred Walker (HE); Winifred
 Wirt Dudley Walton (Ag); Leavenworth
 Logan Byron Warlick (IC); Manhattan
 George Russell Warthen (Ag);
 Webb City, Mo.
 John Wesley Wasson (ME); Peru
 Eleanor Emily Watson (HE); El Dorado
 Mary Goldie Watts (M); Smith Center
 Lavina Amelia Waugh (M); Oskaloosa
 Robert Lee Welton (Ag); Fairview
 Ruth Elizabeth Welton (HE); Fairview
 Albert Parken Wertman (Ag); Washington
 Zoe Dorothy Wertman (HE); Manhattan
 Ruth Ida Whearty (HE); Westmoreland
 Claude White (Ag); Manhattan
 Webster James White (ME); Ada
 Wilton Parker White (EE); Manhattan
 Wiley Whitney (IC); Troy
 Susanna Whitten (HE); Wakarusa
 *Henry Evert Wickers (Ar); Downs
 Howard Williams (EE); Kiowa
 Lewis Rexford Williams (EE); Emporia
 Arthur James Williamson (Ag);
 Manhattan
 *Cecil Cline Wilson (Ag); Canton
 Donald Maxwell Wilson (CE); Atchison
 Ella Inez Wilson (HE); Luray
 Fred Emery Wilson (Ar); Kinsley
 John Leod Wilson (GS); Ottawa
 Maudie Margaret Wilson (HE); Sabetha
 George Hugh Winter (GS); Downs
 Amy Inez Wismer (GS); Pomona
 Chester Stanley Wood (Ag); Manhattan
 Orwin Chester Wood (EE); Topeka
 Philip Redding Woodbury (Ag); Olivet
 Grant Thomas Woodward (VM);
 Manhattan
 Samuel Marion Woodworth (Ag); Sedan
 Alden Baker Woody (IJ); Lincoln
 Frank Joseph Worster (IC); Manhattan
 Bernie William Wright (Ag);
 Arkansas City
 Leroy Lawrence Wurst (EE);
 Russell Springs
 Donald Albert Yandell (VM); Wilson
 John Anton Ziebarth (VM); Manhattan

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FRESHMEN

- Emily Adams (IJ); Maplehill
 Helen Lucile Adams (HE); Everest
 Ralph Adam (CE); Norton
 Glenn Allen Aikins (Ag); Valley Falls
 Waldo Emerson Aikins (Ag); Valley Falls
 Agnes Aldridge (GS); Kansas City
 George Max Allen (EE); Topeka
 William Hurlburt Allen (EE); Rock Creek
 Frances Myrtle Allison (M); Florence
 Earl Beverly Amos (EE); Burlingame
 George Randolph Anderson (CE);
 Kansas City
 Ivan Edward Anderson (CE); Topeka
 Clinton Alexander Anschutz (Ag);
 Spearville
 Raymond Armantrout (Ag); Friend
 Robert Max Armstrong (M); Manhattan
 Alfred Lewis Arnold (Ag); Manhattan
 Ulysses Sam Arnold (EE); Kansas City
 Harold Coleman Ash (M); Manhattan
 Anthony Paul Atkins (Ag); El Dorado
 George Smith Atwood (Ag); La Cygne
 Clara Louise Ausherman (HE); Romona
 Madalyn Avery (GS); Wakefield
 Harold Benton Axtell (EE); Topeka
 Floyd Melvin Ayers (GS); Sabetha
 Ellis Buchanan Babbitt (Ag); Willis
 Vern Albert Badger (EE); Carbondale
 Alma Margaret Baer (HE);
 Steamboat Springs, Colo.
 Mary Elizabeth Bahan (HE);
 Independence
 Grace Elizabeth Baker (HE);
 Arkansas City
 Charles Webster Ballard (Ag); Hazelton
 John Garland Ballard (Ag);
 Manitou, Colo.
 Alvin Banman (GS); Lyons
 Dorothy Charlotte Barnes (HE); Topeka
 Dahy Baskett Barnett (IJ); Manhattan
 Florence Anne Barnhisel (HE); Wichita
 Frank Roy Barnhisel (GS); Wichita
 Sara Elizabeth Barrett (IJ); Frankfort
 Merlin Clyde Barrows (AE); Manhattan
 James Harley Barry (ME); Manhattan
 *Guy Charles Bartgis (Ag); Cedar Vale
 Neil Avery Bartley (GS); Barnes
 Gerald Dunnell Barton (EE); Oxford
 Lillian Mildred Baugh (Ar); Emporia
 Raymond Bayles (Ag); Bozeman, Mont.
 Charles Louis Beal (GS); Kinsley
 Pearl Beckman (HE); Effingham
 Herbert George Bell (Ag); New Cambria
 Ethel Marquel Benfield (HE);
 Lees Summit, Mo.
 Howard Dale Bennett (M); Manhattan
 Wilmer Cline Bennett (FME); Concordia
 Helene Elizabeth Bentley (HE); Sterling
 Virgil Arthur Berridge (Ag); Goff
 Blanche Lorraine Berry (M); Jewell
 Lenore Faydette Berry (IJ); Mankato
 William Glen Berry (EE); Toronto
 Glen McKinlev Beverly (EE); Burlingame
 Fred Goff Billings (Ar); Manhattan
 Elson Joseph Bishop (GS); Glasco
 Paul Page Bishop (CE); Kansas City
 Clo Ina Bixler (HE); Manhattan
 Edith Oretta Blackwelder (HE); Pratt
 Donald William Blair (EE); Centralia
 Louis Charles Blass (Ag);
 West Roxbury, Mass.
 Clemon George Blomgrenn (GS); Randolph
 William Carl Boatwright (Ag);
 Berryville, Ark.
 Mildred Hazel Bobb (HE); Newton
- Eva Lenore Bonecutter (HE); Humboldt
 Orlin Ernest Bonecutter (GS); Pratt
 Blanche Alice Boroff (HE); Manhattan
 Guy Charles Bostwick (Ag); Hoyt
 John Francis Bostwick (EE);
 Junction City
 Carl William Bower (Ag); Manhattan
 Helen Florence Boyd (GS); Spearville
 Howard Christopher Boydston (EE);
 Sterling
 Thelma Irene Bradley (GS); Kidder, Mo.
 Mary Elizabeth Brandley (HE);
 Manhattan
 Richard Willard Brann (CE); Mound City
 Chauncey Allan Brantingham (FME);
 Toledo, Ohio
 Esta Breeden (M); Lenora
 Verna Breese (HE); Wichita
 Ralph Bridges (CE); Arkansas City
 George Thomas Bronson (VM); Waldo
 Amelia Blanche Brooks (HE); Manhattan
 Francis Neil Brooks (CE); Peru
 Lawrence Bickhart Brooks (GS);
 Garrison
 Vera Marguerite Brooks (HE); Hutchinson
 Helen Dorothy Brown (GS); Caney
 Leo Curtis Brown (EE); Sharon
 Ted Arthur Brown (Ag); Fall River
 Chester Leroy Browning (Ag);
 Kingsville, Mo.
 Hugh Carl Bryan (Ag); Osage City
 Reuben Cooper Bryant (CE); Drexel, Mo.
 *Joseph Daniel Buchman (Ag);
 Council Grove
 Guy Emerson Buck (EE); Salina
 John Buckman (ME); McPherson
 Guy Wallace Bulkley (ME); Wakarusa
 Beryl Vesta Bullard (HE); Joplin, Mo.
 Joe Evans Burge (CE); Topeka
 Christine Burger (HE); Seneca
 Francis Paul Burke (VM); Geneva, Neb.
 Beryl Jackson Burkhead (CE);
 Mound City
 Louis Veneil Burlie (EE); Anthony
 Alvis Hugh Burnett (CE); Townner, Colo.
 Harley Kercher Burns (ME); Liberal
 Mary Penelope Burtis (GS); Manhattan
 Alberta Belle Bush (HE); Little River
 Dwight Calvin Bushey (EE); Muscotah
 Floyd Charles Butel (GS); Carbondale
 Carroll Button (Ag); Elmont
 Esteban Aguilar Cabacungan (EE);
 Reina Mercedes, P. I.
 *Matthew John Calto (Ag); Columbus, Neb.
 Chester Canary (GS); Clude
 Florence Carey (GS); Manhattan
 John Lorenzo Carinder (EE); El Dorado
 *Aura Melvin Carkuff (Ag); Manhattan
 Edna Viola Carls (HE); Wakarusa
 Waldon Carson (ME); Randolph
 Dale Carmean (Ag); Valley Falls
 Herbert Harold Carnahan (Ag); Garrison
 Harvey Vernon Carrier (M); Hutchinson
 Mott Titus Carroll (CE); Wichita
 *Robert Rudill Carson (Ag); Hamilton
 Alyce Frances Carter (M); Mound City, Mo.
 Leslie Carter (Ag); Fairview
 William Henry Carter (EE); Clearwater
 Ralph Edwin Casebourn (IC); Neodesha
 Julia Louise Caton (GS); Winfield
 Charles Leo Cavenagh (GS); Perry
 Edward Jost Chapman (CE); Leavenworth
 Francis Charles (IJ); Republic
 Helen Maurine Charles (HE); Great Bend
 Glynn Charlesworth (Ag); Otterbein, Ind.

* Under auspices of Federal Board for Vocational Education.

FRESHMEN—continued.

- Marguerite Chatelain (HE); Onaga
 Hazel Bertha Cheatham (HE); Mulvane
 George Kenneth Chew (EE); White Water
 Burl Quentin Chubb (Ag); Baxter Springs
 Boyd Ransom Churchill (Ag); Piatt, Ill.
 Carl Wesly Clair (Ag); Mendon, Ill.
 Jesse Timberlake Clapp (CE); Logan
 Harold Chapman Clark (GS); Salina
 John Caldwell Clark (EE); Cassoday
 Leta Ruth Clark (HE); Eskridge
 Lois Ancelya Clark (GS); Delphos
 Mary Jane Clark (HE); Anthony
 Jean Clarke (HE); La Cygne
 Ruth Elizabeth Cleary (HE); Stafford
 Eugene Arthur Cleavinger (Ag); Lowemont
 Verne Ole Clements (EE); Havensville
 Charles Robert Clothier (ME);
 State College, N. Mex.
 Foster Dwight Coburn (GS); Kansas City
 Otto Richard Coburn (CE); Preston
 James Calvin Coffman (Ag); Overbrook
 Burton Ellsworth Colburn (Ag);
 Manhattan
 Edgar Stevens Colvin (CE); Hamilton
 Louis James Combs (CE); Bunden
 Halbert Mark Conger (Ag); Natoma
 Jewel Irene Conkel (HE); Niles
 Mildred Althea Conkel (HE); Niles
 William Amy Conrow (GS); Manhattan
 Etta Marie Conroy (HE); Manhattan
 Stella Grace Cook (HE); Bucklin
 Mabel Myrtle Cooper (HE); Hannibal, Mo.
 Elsie Leigh Cope (GS); Bigelow
 Robert Lawrence Copening (EE); Iola
 Marie Correll (GS); Manhattan
 Clifton Gail Cox (Ag); Sedgwick
 Ray Leslie Cozine (Ag); Washington
 Earle Crall (EE); Parsons
 Floyd Hunter Creighton (EE); Manhattan
 Leith Benjamin Crilly (CE); Galva
 Mary Crofton (HE); Van Buren, Ark.
 Walter Tanner Crotchett (Ag); Louisburg
 Helen Golda Crow (M); Wichita
 Edward Cunningham (IJ); Manhattan
 Rose Matilda Cunningham (HE);
 Manhattan
 Clifford Currie (IJ); Manhattan
 Margaret Loretta Currie (HE); Sterling
 Robert Doyle Cuthbertson (IJ); Wichita
 Alan Davis Dailey (GS); Manhattan
 Paul Dakin (Ag); Ashland
 May Danheim (HE); Blue Rapids
 Tavis Eloise Daniels (M); Arkansas City
 Charles Stanley Danielson (Ag); Clyde
 Harry Lindsay Davidson (EE); Topeka
 *Edgar William Davis (Ag); Lyons
 Eleanor Hannah Davis (GS); Gaylord
 Fred Elton Davis (VM); Syracuse, Neb.
 Josephine Davis (HE); Kansas City, Mo.
 Roy Davis (Ag); Towanda
 Frances Marie Dawley (HE); Manhattan
 Charles Decker (Ar); Denison
 Samuel Wesley Decker (Ag); Birmingham
 Everett Leo Deeter (EE); Norcatur
 Donald Reid De Tar (EE); Anthony
 *William Kenneth Dinklage (CE);
 Fort Scott
 *Charles Orville Dirks (Ag); Latham
 Luna Myrle Divilbiss (HE); Olathe
 Maurelle Dobson (GS); Winfield
 Maurice Erle Dodd (EE); Langdon
 Wendell Travis Dodd (Ag); Langdon
 Leonora Katherine Doll (GS); Larned
 Arthur Wayland Donaldson (EE);
 Lost Springs
 Henry Dougherty (CE); Manhattan
 Raymond Rodney Drake (AE); Nekoma
 Millicent Draper (HE); Greeley
 William Arthur Dreany (Ag); La Crosse
 Clifford Henderson Duerfeldt (EE);
 Gordin, Neb.
 Dorothy Fleming Dugan (IJ); Manhattan
 Harold Dewey Dunkleberg (ME); Osborne
 Helen Vare Dunlap (HE); Eureka
 Benjamin Hederstrom Dutton (FME);
 Burlingame
 William Pryor Dwelle (Ag); Cedar Point
 Lawrence Samuel Dyer (Ar); Culver
 Gladys Ebert (HE); Boulder, Colo.
 Alberta Edelblute (GS); Manhattan
 Alfred Douglas Edgar (AE); Ashland
 Allison Boyd Edwards (EE); Herington
 Winifred Maude Edwards (HE); Athol
 John William Egger (Ag); Ellis
 Harold George Ehrhardt (CE); Westphalia
 Dean Archibald Elliott (Ar); Holton
 Leonard Paul Elliott (GS); Holton
 Leonard Ellis (IJ); Valley Falls
 Mary Ruth Ely (HE); Kinsley
 George Malcolm Emrich (EE); Longford
 Leslie Maxwell Epard (GS); Colby
 Helen Marie Ernst (HE); Paola
 Lyle Wayne Ernst (Ag); Manhattan
 Forest Noble Erwin (M); Pratt
 Fred Essig (GS); Bennington
 Shelley Hiram Estes (Ag); Edgerton
 Irene Antoinette Etzold (HE); Liberal
 Mary Catherine Etzold (HE); Liberal
 James Glenn Evans (IC); Chanute
 Ralph Emerson Ewing (AE); Olathe
 Edith Fairchild (HE); Manhattan
 Lewis Harold Fairchild (GS); Almena
 Margaret Anna Falconer (HE);
 Kansas City
 Isla Pearl Falkenstein (HE); Onaga
 James Lyster Farrand (Ag); Hunter
 John Marcus Farrand (Ag); Hunter
 Bertha Lourinda Faulconer (HE);
 El Dorado
 Joseph Faulconer (Ag); El Dorado
 Laura Catherine Fayman (GS);
 Kansas City, Mo.
 Harry Felton (EE); Hays
 George Albert Filingier (Ag); Cuba
 Boyd William Fink (GS); Downs
 Frank Preston Flack (GS); Eskridge
 Herman Vincent Fleming (ME); Nickerson
 Bernice May Fleming (HE); Manhattan
 Vernett Edward Fletcher (Ag); Manhattan
 Angela Louise Floersch (HE); Manhattan
 Eugene Stevenson Floyd (GS); Salina
 Mary Anna Foley (HE); Troy
 Stith Phillips Fontaine (Ag);
 Fort Smith, Ark.
 Gordon Ellis Ford (ME); Burlingame
 Addison Forrester (GS); Manhattan
 John Bently Foster (EE); Stockton
 Marie Ruth Foster (HE); Topeka
 Lee William Frager (EE); Washington
 Theodore Don Francis (EE);
 Kingfisher, Okla.
 Maree Beatrice Freeman (GS); Wichita
 Robert Bruce Frew (IJ); Cottonwood Falls
 John Frey (Ag); Manhattan
 Herbert Levi Frisbie (Ag); Grantville
 Martin Frederick Fritz (IC); Clay Center
 Grace Jeannette Frye (IJ); Richland
 Josephine Adelia Fulcher (HE); Lansing
 Donald Hall Fulton (IJ); Manhattan
 Nellie Gertrude Fulton (M); Harper
 Eugene Randolph Funk (CE); Wichita
 Pearl Martha Gabriel (HE); Eudora
 Beatrice Edith Gaither (HE); Turner
 Earl Edwin Gamber (ME); Ellsworth
 Pauline Catherine Garrett (IJ);
 Denver, Colo.
 Leo Emerson Garrison (CE);
 Lincolnville
 Samuel Peter Gatz (Ag); McPherson
 Hallie De Loss Gay (Ag); Oskaloosa
 Harold Verne George (IJ); Dodge City

FRESHMEN—continued.

- Clark Knight Gibbon (EE); Hartford
 Guy Slagle Gilbreath (GS);
 Arkansas City
 Mabel Josephine Gill (HE); Attica
 Verlin Gilpin (GS); Codell
 Virginia May Giroux (IJ); Wichita
 Henry Herman Gittrich (Ag); Wichita
 Gertrude Glenn (HE); Manhattan
 *Lyle Byron Glidden (Ag); Kansas City
 Charles Franklin Glutch (Ag);
 New York City, N. Y.
 Frances Elizabeth Godden (M); Caney
 Hilda Lenora Goff (HE); Manhattan
 Veneta Frances Goff (HE); Manhattan
 Vernon Cecil Golden (EE); White Water
 Wallace Chester Goodell (IC);
 Independence
 Helen Gordon (HE); Manhattan
 Otis Gould (Ag); Manhattan
 Harold Elbert Gragg (GS); Hutchinson
 Thomas Patrick Grannell (CE); Whiting
 Charles Clayton Griffin (Ag) Nickerson
 Nellie Elizabeth Griffith (HE); Elmont
 Morris Franklin Grimwood (Ag);
 Blanca, Colo.
 Gladys Cansads Gritz (HE); Fall River
 Lou Wesley Grothusen (ME); Ellsworth
 Fred Rexford Guipre (Ag); Simpson
 Charles Frederick Hagberg (Ar);
 Clay Center
 Don Hall (Ag); Oakley
 Alma Loraine Hallowell (GS);
 Washington
 Margaret Jane Hamilton (M);
 Kansas City, Mo.
 Edward Hammond (ME); Belleville
 Walter Lee Hampson (CE); Fredonia
 Agnes Handlin (M); Manhattan
 Louisa Caroline Hannah (HE);
 Kansas City
 Leonard Beath Harden (Ag); Centralia
 Clarence Leslie Harder (Ag); Minneapolis
 George Thomas Harkins (CE); Ottawa
 Charles Adam Harkness (GS); Hays
 Thelma Ceville Harper (HE); Topeka
 George Andrew Harrah (Ag); Kansas City
 Alberta Elizabeth Harris (HE);
 Austin, Tex.
 Eugenia May Harris (M); Manhattan
 Hector Wilfred Harris (CE); Horton
 Jerry Milton Harris (Ag); Eudora
 Marjorie Katharine Harsh (M); Cassoday
 Nellie June Harter (HE); St. John
 William James Hartgroves (Ar); Wamego
 Allen Paul Hartman (IJ); Frankfort
 Carrie Hartman (HE); Manhattan
 Alma Leon Hartzog (HE); Humboldt
 Carl Bernard Hasenyager (EE); Bern
 Ethel Hassinger (M); Parsons
 Alfert Charles Haubrock (Ag); Mendon, Ill.
 John Herman Heald (EE); Goff
 Floyd Chester Healea (AE); Wichita
 Philip Heartburg (IC); Manhattan
 Barton Heath (EE); Fairbury, Neb.
 Alvareta Alice Heaton (M); Concordia
 Polly Hedges (HE); Hutchinson
 Edwin Hedstrom (Ag); Manhattan
 Ludwig Julius Hedstrom (EE);
 Kansas City
 Ursula Carolina Heidrick (HE); Beloit
 Fred Earl Henderson (EE); Dodge City
 Mary Ellen Henderson (HE); Atwood
 Harold William Henney (ME); Horton
 Elizabeth Spears Hepler (GS); Manhattan
 Lee Frederick Herdman (CE); Le Roy
 Olive Hazel Hering (IJ); Stafford
 Richard Charles Herold (Ar); Fredonia
 Mabel May Herr (HE); Medicine Lodge
 Joseph Hayes Herrin (IJ); Dodge City
 Caldwell Hessin (IJ); Manhattan
 Albert Merle Hestwood (CE); Wichita
 Frank Byron Heter (Ag); Sterling
 Austin Theodore Heywood (Ag);
 Bennington
 John McDaniel Hill (Ag); Sedgwick
 Randall Conrad Hill (GS); Manhattan
 Margaret Elizabeth Hinchee (HE); Salina
 Lew Max Hinman (Ag); Hutchinson
 Grace Irene Hinnen (HE); Potwin
 Katheryne Lucille Hitch (HE); Manhattan
 Harold Wesley Hobbs (IJ); Manhattan
 Glen Oscar Hoch (Ag); Hartford
 Harold Andrew Hoffman (CE); Harper
 Russell Carl Hoffman (Ag); Haddam
 Theodore Thomas Hogan (ME);
 Junction City
 Claude Gale Holden (Ag); Ford
 Lois Holderbaum (HE); Kansas City
 Clifford Andrew Hollis (EE); Fredonia
 Geneva Hollis (HE); Fredonia
 Minnie Edna Holmgren (HE);
 Bear River City, Utah
 Grace Naomi Holt (HE); Hoyt
 *Earl Fremont Hoover (VM); Manhattan
 Jesse Orville Hoover (ME); Hamilton
 Hollis Raymond Hope (IJ); Garden City
 Opal Loreine Horner (IJ); Wichita
 William Nelson Hornish (CE); Pratt
 Paul Edgar Hovgard (CE); Abilene
 Frank Lucian Howard (Ag); Chapman
 Lawrence Howard (Ag); Emporia
 Bert Howell (EE); Shaw
 *Charles Bannus Hudson (Ag); Fort Scott
 Eugene Hudson (CE); Winfield
 Harry Newman Hudson (CE); Topeka
 Geraldine Hull (HE); Manhattan
 Hazel Maude Hulse (M); Manhattan
 Leland Stanford Hulshizer (M); Manhattan
 Hazel Humbarger (HE); Salina
 James Norman Hume (EE); Humboldt
 *George Humphrey (Ag); Manhattan
 Margaret Fern Humphrey (HE);
 Manhattan
 Wilbur William Humphrey (Ag);
 Manhattan
 Colbert Clinton Huntingham (Ag); Eureka
 Alice Waverly Husted (IC); Picher, Okla.
 Susie Katharon Huston (HE); Manhattan
 Helen Hutchins (HE); Kansas City
 Bertha May Hyde (GS); Altoona
 Alexander Dewey Imes (GS);
 Webb City, Mo.
 Hal Francis Irwin (Ag); Manhattan
 Chester Lowell Ives (GS); Independence
 Martha Ellen Jacobson (GS); Formoso
 Gladys Marie James (HE); Rossville
 Lena May Jantz (GS); Larned
 Berenice Clare Jarvis (HE); Kansas City
 Romon Quintin Javier (VM);
 Cadiz, Negroes Occidental, P. I.
 William Harold Jeffrey (EE);
 Edmond, Okla.
 *Fred Talbot Jenkins (EE); Winfield
 Ralph William Jenkins (Ar); Perry
 Howard Jenks (GS); Osawatomie
 Albert Theodore Johnson (GS); Paola
 Locata Athene John (HE); Shaw
 Carl Daniel Johnson (EE); Manhattan
 Conrad Hastings Johnson (EE); Latimer
 Earl Gladstone Johnson (EE); Manhattan
 George William Johnson (EE); Ingalls
 Harold Franklin Johnson (IJ); Manhattan
 Lula Annette Johnson (HE); Walsburg
 Myrtle Bonnie Johnson (HE);
 Arkansas City

FRESHMEN—continued.

- Robert Bruce Johnson (Ag); Salina
 Walton Alfred Johnson (ME); Vliets
 Anita Alice Jolley (M); Manhattan
 Arnold Roosevelt Jones (VM); Haddam
 Charley Archer Jones (Ag); Hiawatha
 Raymond Roger Jones (CE); Waterville
 Wendell Jones (Ag); Horton
 Louis Marvin Jordan (IJ); Manhattan
 Horace Chester Jowers (CE); Cheney
 William Harold Jury (CE); Topeka
 Eulalia Ferne Kaiser (HE); Goessel
 Pauline Keith (HE); Council Grove
 Cordell Cline Keller (Ag); Carthage, Mo.
 * Chester Lee Keller (EE); Stafford
 Karl Ernest Keller (EE); Kinsley
 Louis Donald Keller (Ag); Le Roy
 Merle Miscal Kellstadt (Ag); Welda
 Ira David Sankey Kelly (CE);
 Grand Junction, Colo.
 Murray Vaughan Kennedy (Ar); Ottawa
 Eva Marie Kettering (HE); Manhattan
 Cecil Earl Kielhorn (Ag); Cambridge
 * Russell Stanley Kifer (Ag); Springfield, Mo.
 Gilbert Raymond Killian (VM);
 Perryville, Mo.
 Ferris Francis Kimball (Ag); Kansas City
 Elmira Wesson King (HE); Elsmore
 Lucille Kinnamon (IJ); Larned
 Victor Lee Kirk (ME); Iola
 Nellie Janet Klaus (GS); Bendena
 Nilie Charlotte Kneeland (GS); Liberal
 Frances Irene Knerr (GS); Manhattan
 Wilbur Clarence Knight (Ag); Manhattan
 Dorothy Maude Knittle (M); Manhattan
 Pauline Knowler (HE); Enid, Okla.
 Harry Charles Koehler (CE);
 Milwaukee, Wis.
 Schuyler Franklin Kollar (Ag);
 Woodward, Okla.
 Marion Richard Koyl (Ag); Independence
 Arthur Clair Krachy (EE); Ellsworth
 Snoda Grace Krider (HE); Burns
 Thomas Henry Kuhns (ME); Anthony
 Laurence Kuns (M); McPherson
 Helen Mary Kuykendall (GS);
 Twin Falls, Idaho
 Susie Hardcastle Kyle (HE); Abilene
 Carl Leonard Lakeman (EE); Hutchinson
 John Franklin Lalicker (CE);
 South Haven
 Marie Helen Lamson (HE); Paola
 Raymond Charles Lane (Ar);
 Kansas City, Mo.
 James Waggnar Lansing (GS); Chase
 Lawrence Pressney Larkin (CE);
 Ellsworth
 Carl Theodore Larson (Ag); Scandia
 Merville Paul Larson (AC); Vesper
 Tull Lasswell (CE); Manhattan
 Ida Charlotte Latham (HE); Penolos
 Charles Spencer Lawrence (Ag); Emporia
 Elsa Baugh Lear (HE); Stafford
 George Davis Leiser (EE); Paola
 George Washington Leker (Ag); Holton
 Lois Wirt Lemert (EE); Cedar Vale
 Carroll Leonard (ME); Manhattan
 James Michael Leonard (EE); Newton
 Ruth Evangeline Leonard (GS);
 Manhattan
 Roger Milton Lilley (EE); Burns
 * George Daniel Lingelbach (EE); Mineola
 Theodore Edward Linscheid (EE);
 Arlington
 Corinne Locke (HE); Erie
 William Karl Lockhart (EE); Humboldt
 La Belle Marie Lomax (HE);
 Arkansas City
 Carl Walter Londerholm (CE);
 Kansas City
 Lester Long (CS); Kingman
 Frances Inez Lonnberg (HE); Spearville
 Herbert Melvin Low (EE); Topeka
 Ruth Viola Luginbill (HE); Greensburg
 Dorothy Bertha Lukert (HE); Topeka
 Forrest Nathan Luthey (CE); Carbondale
 Walter Henry Lutz (CE); Sharon Springs
 Clarence Joseph Lydick (EE); Anthony
 Edwin Cleaveland Lyman (Ag); McDonald
 Harris Kelley McAtee (Ar); Parkersville
 Elvera Christine McCammon (IJ);
 Manhattan
 Lorin Everett McCarty (Ag); Ames
 Harry Wright McClelland (GS); Iola
 Margaret McClurkin (HE); Clay Center
 Betty La Vern McCain (HE); Wichita
 Jennie Scelina McComb (HE); Topeka
 Nellie Rebecca McComb (HE); Topeka
 Ethel Irene McConnell (HE); Russell
 Henry Landon McCord (ME); Manhattan
 Sidney Allyn McCracken (GS); Overbrook
 Irwin Hayden McCutcheon (ME);
 Burlingame
 Gerald McDonald (GS); Frederick
 Sharon McFadden (EE); Chanute
 Florence McKinney (HE); Great Bend
 William Harry McMahan (ME); Newton
 John McMoran (ME); Coldwater
 Leah Christine McNatt (HE);
 Fort Smith, Ark.
 * Earl McWilliams (Ag); Alta Vista
 Cary Reid Machir (Ag); Kansas City, Mo.
 Lawrence Edward Maddox (EE);
 Hazelton
 Edgar Charles Madison (EE); Spivey
 Jasper Jack Madison (CE); Spivey
 Harry Leroy Madsen (EE); Natoma
 Aden Combs Magee (Ag); Canadian, Tex.
 Marguerite Pauline Mallory (HE);
 Topeka
 James Dillon Marcell (IJ); Highland
 Frances Emily Mardis (HE); Preston
 Vivian Anna Marly (GS); Phillipsburg
 Leslie Louis Marsh (Ag); Chanute
 Alice Tweed Marston (GS);
 Wilmington, Del.
 Elmer Martin (Ar); Stockton
 George Eli Martin (VM); Perry, Mo.
 Raymond Wadsworth Martin (EE);
 Parsons
 Ruth Martin (HE); Hiawatha
 Marvin Mason (GS); Moline
 Albert Emile Matthey (CE); Merriam
 Clara Lillian May (IJ); Holton
 Ross Wesley May (ME); Holton
 Colletta Mayden (GS); Manhattan
 Rolla Daniel Mayden (CE); Manhattan
 Clyde Westel Means (AE); Derby
 Gareld David Meek (ME); Topeka
 Ross Meisenheimer (FME); Kingman
 * Henry John Melcher (EE); Concordia
 Edward Winebright Merrill (GS); Le Roy
 Charles Robert Merritt (EE); Caldwell
 Mildred June Meserve (IJ); Ellis
 Alva Ernest Messenheimer (EE); Admire
 Roxie Meyer (GS); Wamego
 Jacob Emery Middlekauff (Ag); Vesper
 Buford John Miller (Ag); Piedmont
 Ernest Miller (ME); Coffeyville
 Frank Miller (ME); Caney
 Helen Gould Miller (HE); Manhattan

FRESHMEN—continued.

- Marion Francis Miller (Ag); Norton
 Raymond Mather Miller (CE); Centralia
 Eth I Mills (HE); Manhattan
 James Richie Modrall (VM); Wichita
 Alice Viola Monsey (GS); Arkansas City
 Ada Ernestine Montague (HE); Anthony
 Albert Edward Montgomery (EE);
 Greenwood
 Henry Granville Mooney (EE); Ingalls
 Hubert Franklin Moore (Ag); Altoona
 Lena Josephine Moore (HE); Wakarusa
 Bud Wesley Morford (ME); Augusta
 Leonard Benjamin Morris (Ag); Paxico
 Sarah Sylvania Morris (HE); Manhattan
 Genevieve Elizabeth Mott (HE); Herington
 Louise Mowry (M); Manhattan
 Albert Deidrich Mueller (Ag); Hanover
 George Vernon Mueller (ME); Sawyer
 Ralph Muir (Ag); Salina
 Meria Kathleen Murphy (HE); Perth
 Ralph Myers Murray (EE); Protection
 Virgil Fay Murray (GS); Nickerson
 John Kenneth Muse (Ag); Manhattan
 Nancy Mary Mustoe (HE); Norton
 Bernice Eola Myers (M); Manhattan
 Walter Emory Myers (Ag); Eskridge
 *Orin Edward Nay (AC); Manhattan
 George Pinckney Neal (Ag); Topeka
 Leonard George Nehring (GS); Alma
 Margaret Nettleton (HE); Lenora
 Albert Taylor Newman (ME); Coffeyville
 Ralph Merrill Nichols (CE); Oskaloosa
 Charles Anthony Nicholson (Ag); Olathe
 Glenn Nesbitt Niquette (ME); Salina
 Luther Owen Nolf (Ag); Bennington
 Ruth Norman (IJ); Eureka
 Carroll Amos Norquest (Ag); Fredonia
 Floyd Orlando Northrup (IJ);
 Lawton, Okla.
 John Evans Norton (Ag); Grainfield
 Mary Esther Nuttle (HE); El Dorado
 Rexford Donald Okeson (ME); Fairview
 Zoe O'Leary (HE); Phillipsburg
 Floyd Robert Oliver (CE); Neodesha
 Roberto Ramiris Oliver (Ag);
 Urdameta, Pangasinan, P. I.
 Marv Elizabeth O'Neil (GS); Prescott
 Marjorie Lois O'Neill (M); Manhattan
 Roy Daniel Oplinger (ME); Jewell
 Earl Eugene Orr (EE); Hepler
 Ignacio Ortiz (IC); Manhattan
 Lawrence Lewis Osborn (GS);
 Veedersburg, Ind.
 Roy Wesley Osborn (EE); Bryan, Tex.
 William Joseph Overton (EE);
 Lees Summit, Mo.
 Lowell Henry Paddock (AE); Lakin
 Evan Herbert Palmer (EE); Palmer
 Jeannette Elizabeth Pardee (HE);
 Kansas City, Mo.
 James Edward Parker (GS); Paola
 Harold Earnest Parkan (Ar); Utica
 Walter Lovelace Parrott (VM); Muscotah
 Goldie Ruth Paslay (M); St. George
 George Walter Pate (EE); Nickerson
 Robert Patterson (Ag); Ellsworth
 *Fred Harold Paulsen (Ag); Stafford
 Norton Crandell Payne (ME);
 Kansas City, Mo.
 Vivian Ona Peak (M); Manhattan
 William Pears (EE); Clay Center
 *Royce Pence (Ag); Colby
 William Russell Pendleton (GS);
 Manhattan
 Edward John Perkins (Ag); Rosedale
 Edward Petr (EE); Cuba
 Alma Elanore Petrasek (HE); Jennings
 Sylvia Irene Petrie (GS); Pratt
 Austin Harold Pfeiffer (EE); Hamlin
 Don Scott Pfuetze (GS); Manhattan
 Jesse Clayton Pickering (Ag); Langdon
 Rudolph Paul Plagge (ME); Belle Plaine
 Roy Caylon Porter (EE); Norton
 John Loran Porter (Ag); Quinter
 John Charles Post (GS); Brawley, Cal.
 Harold Elmer Potter (Ag); Sterling
 Maude Blanche Powell (HE); Kansas City
 Otto Le Roy Pretz (Ag); Olathe
 Guy Jennings Prichard (EE); Abilene
 Harry Herbert Prichard (VM); Abilene
 Dorothy Hortense Pugh (HE);
 Muskogee, Okla.
 Harry Donald Pugh (Ag); Topeka
 Addison Pursley (CE); Jetmore
 Joseph John Quinn (Ar); Salina
 Margaret Elizabeth Raffington (HE);
 Hutchinson
 Glen Bradshaw Railsback (Ag); Langdon
 Ernest Lee Raines (Ag); Louisburg
 Frank Merrett Rainey (IJ); Manhattan
 Walter Patrick Raleigh (Ag); Clyde
 Simeon Baniaga Rambac (ME); Salano,
 N. V., P. I.
 Ray Randels (Ag); Anthony
 William Rankin (CE); Manhattan
 *Alfred Rapp (IC); Americus
 Evan Carl Rath (ME); Agenda
 Anne Louise Ratliff (IJ); Manhattan
 Herschel Henry Rayle (Ar); Osawatomie
 Harold Paul Reaume (FME); Ellsworth
 Octavia Rector (HE); Hickman Mills, Mo.
 Edith Viola Reece (HE); Riley
 Leland Harold Reece (EE); Oxford
 Hervey Omer Reed (EE); Cassoday
 Irma Margaret Reed (HE); Quenemo
 Ruth Shannon Reed (HE); Cassoday
 George Vernett Reeves (Ag); Netawaka
 Ernest Leo Reichhart (Ag); Toledo, Ohio
 Frank Oliver Renner (CE); Rush Center
 Harold William Retter (CE); Topeka
 Frederick Thomas Reyling (AE);
 Kansas City, Mo.
 Forrest Reynolds (EE); Phillipsburg
 Lawrence Otto Reynolds (Ag); Pierce City,
 Mo.
 Mark Duncan Rice (Ag); Cullison
 Frank Lee Richards (EE); Manhattan
 John William Richards (GS); Manhattan
 Doris Ione Riddell (HE); Salina
 Arthur Howard Riley (VM); Manhattan
 Durand Belmont Rising (EE); Salina
 Frank Barton Robb (CE); Scott City
 Charles Wesley Roberts (CE); Oskaloosa
 Max Duane Roberts (Ag); Pomona
 Lester George Robinson (Ag); Galesburg
 Mary Luella Robinson (HE); Florence
 Margaret Teresa Rochford (M); Osborne
 Thomas Ewing Rodgers (IC); Manhattan
 Mary Jane Roesener (HE); Manhattan
 Arthur Lincoln Rogers (EE); Quinter
 Bruce Abner Rogers (GS); Quinter
 John Imile Rogers (Ag); Manhattan
 Nicol Gosler Rogler (CE); Matfield Green
 Edna Mae Romick (IJ); Valencia
 Margaret Jane Romick (HE); Maplehill
 Roland Edmond Roney (Ag); Scranton
 Mayetta Roper (HE); Barnes
 Herbert Arther Rose (EE); Waldron
 John Whiteley Rose (Ar); Luray
 James Rosiere (ME); Florence
 *Morris Emory Rowe (Ag); Winfield
 Easborne Rusco (ME); Clifton
 William Franklin Rush (Ag); Cedar Vale
 Lawrence Oscar Russell (AE); Marysville
 Orpha Eileen Russell (M); Manhattan
 *Ray Cecil Russell (Ag); Soldier
 Ruth Jane Russell (HE); Stafford
 Stanley Dewey Russell (Ag); Winfield

* Under auspices of Federal Board for Vocational Education.

FRESHMEN—continued.

- Sylvia Lanora Russell (GS); Lyons
 Cecil Reed Ryan (GS); Gravette, Ark.
 Hugo Oscar Saffry (GS); Alma
 Jewell Jennie Sams (HE); Kansas City, Mo.
 Dorothy Louise Sanders (M); Leavenworth
 George Roch Saunders (ME); Pleasanton
 Robert Earl Saxton (Ag); Manhattan
 Ruby Sarah Saxton (HE); Manhattan
 Laurence Schaal (Ag); Manhattan
 Elwyn Scheel (EE); Emporia
 Lester John Schmutz (Ag); Junction City
 Louise Emelie Schneider (HE); Kansas City
 Raymond Lois Scholtz (Ag); Frankfort
 Charles Frederick Schultz (Ag); Manhattan
 Grace Dorothy Schultz (HE); Manhattan
 Everette Clifford Scott (Ag); Galena
 Irene Scott (HE); Westmoreland
 Thomas Sears (Ag); Eureka
 Earl Shannon (GS); Hutchinson
 Frank Sharpless (EE); Osage City
 John Encell Sheely (Ar); Bucklin
 Esther Shelly (HE); Atchison
 Charles Emmett Sherer (Ag); Mullinville
 Roy Zola Sherer (VM); Mullinville
 Ralph William Sherman (Ag);
 Burlington, N. J.
 Lillian Gertrude Shimmick (M); Jennings
 James Shivelev (Ag); Manhattan
 Otho Wilbur Shoemaker (Ag); Overbrook
 Wendell Ansell Simmons (GS); Enid, Okla.
 Frank Lee Roy Simpson (EE); Spearville
 Nathan James Simpson (ME); Agra
 Clarence Everette Slater (Ar);
 Arkansas City
 Beatrice Helen Sloan (HE); Pampa, Tex.
 Ray Sloan (EE); Independence
 George Emmett Smalley (GS);
 Kansas City
 John Rolland Smiley (EE); Stafford
 Earl Smith (Ag); Pratt
 Helen Irene Smith (HE); Salina
 Joseph Stewart Smith (ME); Mount Hope
 Lester Roosevelt Smith (VM); Dunbar, Neb.
 Marion Welsh Smith (ME); Derby
 Opal Ellen Smith (HE); Manhattan
 Paul Eugene Smith (IJ); Herington
 Ray Leonel Smith (EE); Washington
 Samuel Lewis Smith (ME); Mount Hope
 Harold William Smythe (CE); Wichita
 *Harry Jay Snodgrass (Ag); Gardner
 Charles Edward Snyder (Ag); Soldier
 Raub Rall Snyder (CE); Protection
 Myron Homer Soupeine (Ar); Manhattan
 Ralph Sours (Ag); Manhattan
 Mae Estella Sower (HE); Elmo
 Ellis George Sparks (Ag); Bison
 Maurice Burnett Spear (Ag); Bushong
 Annie Henderson Spence (HE); McPherson
 Clarence Martin Spencer (FME); Emporia
 Edna Josephine Spickerman (HE); Topeka
 Glenn Wesley Spring (EE); Manhattan
 John Irvin Stafford (GS); Dunavant
 Ross George Stapp (CE); Norcatur
 Arthur Raymond Stark (GS); Belleville
 Marion Stauffer (GS); Manhattan
 Carl Edward Steenson (CE); Waterville
 Grace Ann Steininger (HE); Clay Center
 Alice Stewart (Ag); Wisdom, Mont.
 Anna Caroline Stewart (HE); Morganville
 Rachel McCune Stewart (HE); Winchester
 Roland Earl Stimson (EE); Concordia
 Bruce Stinson (Ag); Spearville
 Alfred Leonard Stockebrand (Ag); Vernon
 Gladys Arena Stocker (HE); Concordia
 Warren Edward Stone (Ag); Saffordville
 Curtis Trueman Stout (Ag);
 Cottonwood Falls
 Wyatt Warren Stout (Ag); Medicine Lodge
 Austin William Stover (GS); Topeka
 Iness Effa Straight (M); Bedford, Iowa
 Melba Elizabeth Stratton (IJ); Udall
 Fred David Strickler (Ag); Hutchinson
 Faye Marie Strong (IJ); Manhattan
 James Elias Strother (EE); Kiowa
 *Richard Raymond Stucky (Ag);
 Moundridge
 Otto Engel Stueber (ME); Parsons
 Theodore Stueber (Ar); Parsons
 William Henry Swab (VM); Haddam
 Lester Boggess Swaney (Ag);
 Mercedes, Tex.
 Hazel Marie Sweet (HE); Manhattan
 Mildred Pauline Swenson (IJ);
 Clay Center
 Harry Alcide Swim (EE); Manhattan
 Oliver Ellsworth Taintor (Ag); Wichita
 Howard Hobson Taylor (Ag); White Cloud
 William Henry Teas (Ag); Lenexa
 Lila Pearl Tector (HE); Canton
 Nellie Alvina Tector (HE); Canton
 Harvey Northrup Thackery (ME);
 Poplar, Mont.
 Grover Cleveland Thomas (Ag); Fall River
 Norris Ray Thomasson (EE); Parsons
 Cordis Aubrey Thompson (Ar); Mulvane
 Tyra Anne Thruston (HE); Kansas City
 James Wilson Tobias (CE); Cedar Vale
 John Hollis Tole (ME); Independence
 Kenneth Marshall Topping (GS);
 Overbrook
 Grant De Witt Troutman (Ag); Lewis
 Florence Ellen True (HE); Perry
 Ethel Florence Trump (HE); Russell
 Perl Rhode Tumbleson (GS); Syracuse
 Milton Ashby Turpin (ME); Winfield
 Nina Winella Uglow (HE); Ames
 Verne Leon Uhland (Ag); Rozel
 Anna Louise Uhlrich (HE); Wamego
 Anna Jean Unruh (HE); Pawnee Rock
 Alice Sarah Updegraff (HE); Maplehill
 Manuel Carlos Valdes (CE);
 Santiago, Chili
 Helen Margaret Van Gilder (M);
 Manhattan
 Helen Esther Vanguist (GS); Randolph
 Leland Stanford Van Scoyoc (EE);
 Manhattan
 Lillian May Viar (HE); Dunlap
 Paul Anthony Vohs (EE); Osawatomie
 Arrilla Wadsworth (M); Cottonwood Falls
 Harold Oral Waggoner (IC); Kansas City
 Emma Julia Wagner (HE); Lenexa
 Arthur Rutherford Waits (Ag); Cassoday
 Albert Edward Walker (EE); Topeka
 Clarence Dale Walker (Ag); Yewed, Okla.
 Ida Jane Walker (HE); Manhattan
 John Chadwick Wallace (Ag); White City
 Chalmers Lois Waller (Ag); Horton
 Gladys Ellen Walters (HE); Lenexa
 *Isom Raymond Ward (EE); Tampa
 Joe Ralph Waterman (CE); Florence
 Wilbur Ellis Watkins (GS); Enterprise
 Edward Watson (Ag); Osage City
 Virginia Elizabeth Watson (HE);
 Ash Grove, Mo.
 Nora Elaine Watters (HE); Axtell
 Curtis Watts (M); Winfield
 Beulah Fave Weaver (HE); Dunlap
 Rollin Dale Webb (EE); Cedar Vale
 Ruth Louise Webb (HE); Tonganoxie
 Howard Gilbert Webber (Ag); Dodge City

FRESHMEN—concluded.

- Norman Nathaniel Weberg (Ag); Salina
George Herman Weckel (EE); Garnett
Edwin William Weeks (GS); Kansas City
Marie Weinheimer (HE); Ottawa
Carl Weiss (Ar); Ada
Lewis Barrett Welch (Ag); Fort Scott
William Joseph Welker (AE); Coffeyville
George Rufus Wells (EE); Meade
Floyd Lavern Werham (EE); Bennington
Frank Loy Westerman (EE); Colby
Thelbert Lerov Weybrew (EE); Wamego
Mabel Ellen Whearty (HE); Westmoreland
Eleanor Beatrice White (HE);
Rogers, Ark.
Margaret Maxwell White (HE); Parsons
Ray Presely White (Ag); Topeka
William Ralph White (Ag); Lockney, Tex.
Bracewell Dighton Whitehead (Ar);
Abilene
Maude Irene Whitehead (HE); Abilene
Bruce Dean Whitney (Ag); Speed
Kathryn Whitten (HE); Wakarusa
John Camp Wilkins (CE); Kansas City
Francis Hall Wilkinson (Ar); Sedgwick
*Frances Williams (EE); Broughton
John Reed Williams (GS); Florence
Raymond Montrose Williams (VM);
Rosedale
Maurice Marion Williamson (Ag);
Mission Hills
Oral Martin Williamson (Ag);
Kansas City
Marie Isabelle Willis (M); Beattie
Charles Edward Wilson (EE); Neal
Earl Sanford Wilson (EE); Jetmore
Grace Dorothy Wilson (HE); Centralia
Ivan Venton Wilson (EE); Tonganoxie
*Manry Ray Wilson (EE); Luray
Naomi Ruth Wilson (HE); Sedgwick
Bernice Winkler (IJ); Maplehill
Paul Raymond Wise (CE); Clearwater
Audra Emma Alice Wolf (HE); Jennings
James Blaine Woodman (Ag); Manhattan
Edgar Carl Woodrick (Ag); Valley Falls
Ralph Meredith Wooley (IJ); Girard
Leonard Aaron Workman (Ag);
Saffordville
Lucile Woulfe (GS); Newton
Franklin Neal Wray (CE); St. John
Adrian Morris Wright (ME); Valley Center
Mildred Ione Wright (HE); Washington
Raymond Yoder (EE); Newton
Marguerite Jane Young (HE);
Kansas City
Vida Laura Zabel (HE); Onaga
Noah Darrell Zeigler (Ag); Oakley

SPECIAL STUDENTS

- Frank Clark Adams (Ag); Elmdale
Harriet Jane Allen (M); Leavenworth
Elmer Eugene Archer (GS); Carlyle
*Andrew Ansel Axline (Ag); Pratt
Marjorie Manetta Babb (GS); Douglass
Eleanor Frances Ball (GS); Gallatin, Mo.
Ralph Ball (GS); Manhattan
Donald David Ballou (GS); Delphos
Kenneth Ballou (Ag); Delphos
Ellen Margaret Batchelor (HE);
Manhattan
Elsie Kathryn Bergstrom (M); May Day
Lucia Mollie Biltz (GS); Manhattan
*Asa George Bird (Ag); Fort Scott
*Floyd Arthur Bleger (Ag); Saxman
Elna Elizabeth Blom (GS); Chapman
Orille Bourassa (GS); Topeka
Leone Cheever Bower (GS); Manhattan
Palmer Fair Bressler (Ag); Manhattan
Nelle Ruth Briggs (GS); Wichita
Preston Edward Brown (Ag); Atchison
Edward Browne (GS); McLouth
William Earl Bruce (GS); Wichita
Kenneth Luther Buck (Eng); Wichita
Helen Ferguson Burk (HE); Ottawa
Cullen Ingomar Burnett (Ag); La Cygne
Hartzell Burton (Ag) Wichita
Howard Ernest Burton (Ag); Council
Grove
*Jesse Albert Byler (Eng); Girard
*Mark King Cady (GS); Fredonia
*Constantine Diamandis Calogeras (Eng);
Manhattan
Susan Carmody (GS); Manhattan
Glen Marvin Case (M); Alta Vista
Manley Albert Casement (Eng); Sedan
Helen Edith Cass (GS); Collyer
Myron Glenn Cassidy (GS); Manhattan
Allen Annesley Cavanaugh (GS); Fort Riley
Vera Valentine Chambers (GS); Quenemo
James Tsumu Cheng (GS); Manhattan
Etta Estella Chillson (GS); Manhattan
Kenneth Franklin Clark (Ag); Lascar,
Colo.
Roxie Opal Clark (GS); Fredonia
Carlos William Cleary (GS); Stafford
Harold Grant Colby (GS); Iola
Harold Bullet Combs (M); Elkhart
*John Leonard Cookley (CE); Kansas City
*Metheny John Copeland (EE); Quinter
Hazel Alma Copenhafer (GS); Manhattan
Charles Edwin Couch (GS); Anthony
Floyd Carl Cragg (Ar); Manhattan
Doris Crane Davis (HE); Manhattan
Antonio de la Garza (AE); Monterey,
Mexico
Alvaro des Essarts (Ag); Pelotos, Brazil
Florence Lillian Dial (GS); Manhattan
Marguerite Luella Dickerhoof (M);
Manhattan
*Clyde Charles Dilley (GS); Beattie
*Arlie Duree (Ag); Leavenworth
John Vance Eastwood (GS);
Independence, Mo.
Donald Eibert (GS); Ness City
Milton Stover Eisenhower (IJ); Abilene
John Burton Elliot (M); Manhattan
Jessie Josephine Erickson (GS);
Manhattan
Louise Helen Everhardy (GS);
Leavenworth
Charles Ewing (Ag); Olathe
John Filingier (GS); Cuba
Daisy Boswell Floyd (HE); Manhattan
*Frank Carl Foreman (Eng); Coldwater
Blanche Evans Forrester (GS); Manhattan
*Clarence Friend (Ag); Hodgenville, Ky.
Roy Preston Garrett (GS); Manhattan
Elizabeth Sharp Gates (GS); Topeka
Mertha Vivian Gear (GS); Manhattan
Hazel Hyatt Geiger (HE); Wichita
Dan Gordon (GS); Manhattan
Emmett Stanley Graham (GS); Manhattan
Mary Graham (HE); Manhattan
Allen Edward Green (Ag); Eureka
Luke Albert Guilfoyle (Ag); Wamego
Robert Alfred Gwinn (GS); Anthony
Francis Lester Haggard (ME); Topeka

* Under auspices of Federal Board for Vocational Education.

SPECIAL STUDENTS—continued.

- Alvin Bentley Haines (EE); Hutchinson
Joseph Robert Hall (EE); Kansas City
Thomas Dawson Hampson (GS); Fredonia
Meade Hargiss (Ag); Manhattan
Wallace Temple Hazelwood (GS);
Canyon, Tex.
*Harvey Doughty Henschel (GS);
Kansas City, Mo.
Donald Myron Herrick (GS); Hutchinson
Olen Hindman (Ag); Wright
Hildred Hines (GS); Scott City
Lee Wayne Hinshaw (IC); Wa Keeney
Lowell Hoatson (Ar); Topeka
Howard McNeice Hobbs (IJ); Lebanon
*Orville Hoff (Ag) Kansas City, Mo.
George Arthur Holloway (GS);
Hutchinson
Araminta Holman (GS); Leavenworth
Wallace King Holsinger (Ag); Rosedale
James Riley Hopper (GS); Ness City
Fahy Williams Hurst (GS); Medford, Okla.
Archibald Hurtgen (ME); Manhattan
Ralph Josiah Hutchman (Ag); Pittsburg
Rachel Jacobs (GS); Council Grove
*Harry Jennings (ME); Manhattan
*George Frederick Johnston (Eng.); Topeka
Herbert Wilson Jordan (Ag); Seneca
Mohammed Kamal (Ag);
Zenab Cairo, Egypt
Ellis Kimble (EE); Liberal
Arthur Glenn Kincaid (Ag); Wathena
Lee Travis King (GS); Manhattan
*Bertie Ray Kirkpatrick (Ag); Paradise
Theodore Augustus Knox (Ag); Frankfort
*Homer Leonard Krebs (CE); Manhattan
Amy Frances Krueger (GS); Neosho Falls
Ralph Paul Lane (GS); Atchison
Mariana Lasswell (GS); Manhattan
Ernest Arthur Laude (GS); Humboldt
Lemuel Allyn Laybourn (IJ); Oakley
Fern Amy Leland (GS); Wichita
*John Clyde Lentz (FME); Holton
Josie Long (GS); Manhattan
Louis Albert Long (ME); Kansas City
Marie Long (M); Manhattan
John Benedict Lough (Ag); Baldwin
Henrietta Vera McClelland (GS);
Manhattan
Jessie Bird McCracken (GS); Manhattan
Helen Ball McDonald (HE); Kansas City
Laura McGilliard (GS); Manhattan
Joe Slater McGuire (Ag); Pawhuska, Okla.
*James Clyde McKay (IC); Kenneth, Mo.
Chester George McKee (GS); Minneapolis
Iona Grace McKinney (GS); Englewood
Elizabeth Jane Mabie (GS); Kansas City
*Wilbur Samuel Magill (ME); Manhattan
George Mahaffy (GS); Ottawa
Alice Manley (GS); Cheney
*Claude Stanton Marshall (Ag); Gardner
William Worthington Marshall (Ag);
McPherson
Faith Martin (GS); Winfield
*Perry George Means (Ar); Protection
Raymond Bert Messing (Ag); Ashland
Jose Angel Mier (Ag);
Aguas Calientes, Ags., Mexico
George Albert Miller (EE); Topeka
Margaret Clay Miller (GS); Manhattan
Richard Roscoe Miller (CE); Manhattan
Cecil Moore (GS); Manhattan
Newell Moore (GS); Great Bend
Linus Edward Muse (GS); Wichita
Frank Lewis Myers (M); Topeka
Stella Gertrude Nash (HE); Topeka
Thomas Neely (GS); Abilene
Ray Mobart Newkirk (Ag); Geneseo
Gladys Lucile Newton (GS);
Independence, Mo.
*George Thomas Nicholson (CE);
Hutchinson
John Mahlon Noll (GS); Florence
Clarence Edgar Norrie (Ag); Sabetha
Chester Willis Oakes (Ag); Manhattan
William Orr (Ag); Manhattan
Alfred Milton Patterson (Ag); Ford
Ella Mae Pastian (M); Clay Center
Benjamin Pfister (VM); Fort Scott
*John Newton Hagan Phleger (Ag); Russell
*Samuel Pickard (Ag); Kansas City, Mo.
Martha Pittman (GS); Manhattan
Walter Edward Ploeger (M); Robinson
Sybil Alma Short Porter (GS); Manhattan
*Quincy Daniel Powdrill (Ag); Taft, Okla.
*Russell Meredith Prescott (Eng);
Parkersville
Mary Price (GS); Mound Valley
Mildred Pritchard (HE); Junction City
John Lyndon Rader (GS); Caney
Agnes Ramey (GS); Manhattan
Marion Ramsey (GS); Osage City
John Walter Reel (GS); Manhattan
*William Edward Reynolds (Eng);
Dupo, Ill.
Alice Maurine Rice (M); Topeka
Frank Leslie Roark (GS); Manhattan
Ethel May Rodman (GS); Cheney
James Boyles Rogers (GS); Manhattan
Lloyd Edwin Rogler (Ag);
Cottonwood Falls
Nell Ellen Roop (GS); Wakefield
Stella Marsh Rudisell (HE); Manhattan
Bessie Marguerite Russell (HE); Muscotah
Morton Rust (GS); Downs
William Sapcut (Ag) Apache, Okla.
Clayton Sauer (Ag); Bendena
Abraham Rabie Saunders (Ag);
Boshof, South Africa
Marie Sellers (GS); Wellington
*Edward Shaffer (GS); Minneola
Evelyn Gladys Sharp (GS); Rogers, Ark.
Vina May Sherman (HE); Manhattan
Ralph Shideler (GS); Girard
Cloyce Virgil Simmons (GS); Abilene
Dale Simonson (Ag); Anthony
Carl Franklin Simpson (GS);
Tulsa Okla.
*Joseph William Skinner (EE); La Harpe
Joseph Charles Slatten (Ag);
Jamesport, Mo.
Adeline Mae Smith (HE); Neosho Falls
*John Wesley Smith (Ag);
Prairie View, Tex.
Labib Boutros Solomon (GS);
Cairo, Egypt
Richard Harold Stanhope (GS); Eureka
Everett Alden Stephens (GS); Abilene
Mildred Sterling (GS); Clay Center
Robert Goodrich Strong (GS); Wichita
Emma Stutz (HE); Manhattan
*Joseph Frank Swarner (EE); Hartford
Milon Burdette Swartz (GS); Hiawatha
Stanley Swenson (IJ); Manhattan
Helen George Swope (GS);
Kansas City, Mo.
William Wayne Teeters (GS); Abilene
Franque Helen Tenney (GS); Manhattan
Jessie Reynolds Terrell (GS); Manhattan
*Leo Albert Thogmartin (CE); Fort Scott
Lasca Ilene Thomas (GS); Topeka
Lola Thompson (HE); Geneseo
Dessie Thornburg (HE); Manhattan
*Emile Aubrey Toms (Ag); Independence
Marion Louise Traynor (GS); Dodge City

SPECIAL STUDENTS—concluded.

*Dick Lawrence Trego (EE); Little River
Ernest Leonard Paul Treuthardt (Ag);
Washington, D. C.
Charles Lee Turley (GS); Hutchinson
Fernando Valdes (Ag); Santiago, Chili
Walter Johnson Veale (Ag); Valencia
Ferdinand Voiland (IJ); Topeka
Gretchen Voiland (HE); Topeka
Lynn Emery Wagoner (IJ); Salina
May Irene Wampler (HE); McPherson
Gilmore Wann (GS); Hays
Harry Kneeland Wareham (GS);
Manhattan
William Everett Wareham (GS);
Manhattan
Fred Charles Weide (Ag); Yates Center

Donald Weir (Ag); Estherville, Iowa
Garnett Westbrook (GS); Manhattan
Ethel Viola Whearty (GS); Westmoreland
Vera May Ford Wichers (HE); Axtell
Thelma Willard (HE); Concordia
Don Paul Williams (GS); Rush Center
Ervin Williams (Ag); Longford
Phil Williams (GS); Ottawa
Virgil Reece Williams (GS); Kingman
Jerome Wilson (GS); Kinsley
George Wood (Ag); Anthony
Wallace Leland Woodward (GS);
Fort Scott
Harold Veere Zimmerman (GS);
Hutchinson
Percy Zink (Ar); Erie

SUMMER SCHOOL

Hattie Julia Abbot; Manhattan
*Asa James Adams; Leslie, Mo.
Kathryn Ruth Adams; Topeka
*William Fred Adams; Ridgeway, Mo.
Gladys Virginia Addy; Manhattan
*James F. Adee; Manhattan
Jessie Gertrude Adee; Wells
Clarinda Bell Alexander; Manhattan
Ina Belle Allen; Manhattan
Ruth Helen Allen; Elmdale
Fern Catherine Allison; Kinsley
Anne Susie Amstutz; Halstead
George Clarence Anderson; Bronson
Hilda V. Anderson; Delavan
*Hugh Paxton Anderson; Norton
Mary Clarissa Anderson; Huron
Mildred Rose Anderson; Delavan
Nelson Joseph Anderson; Manhattan
Austin Chandler Andrews; Hiawatha
Esther Etta Andrews; Manhattan
William H. Andrews; Manhattan
Mildred Jeanette Arends; Kansas City
Eva Alice Armstrong; Holton
Robert Max Armstrong; Manhattan
*Chester Gladstone Aument; Manhattan
*Elmer Rex Ausemus; Cherokee
*Robert Allan Austin; Oskaloosa
Margaret Ellen Baker; Washington
Vera Baker; Manhattan
Helen Hunt Bales; Manhattan
*Claude D. Ball; Montgomery, Mo.
*Edgar Lee Ball; Parsons
Denise Bandry; Atchison
Ida May Bare; Protection
Harold Reuben Barnes; Hiawatha
Harold Winthrop Batchelor; Manhattan
Burton Bernard Bayles; Manhattan
Gertrude Helen Beardsley; Russell
Ernest Leo Bebb; Reading
*Frederick Bell; Kansas City
Bessie Ethel Beougher; Oakley
*Glen Dennice Beougher; Oakley
Gladys Bergier; Manhattan
*Leith John Bergier; Downs
Anna Lillian Best; Manhattan
*Joseph Robert Bethke; Rossville, Md.
*Adolph Louis Betz; Alton, Ill.
*Asa George Bird; Fort Scott
*John Bishop; College Park, Md.
*Floyd Arthur Bleger; Saxman
Mrs. Floyd A. Bleger; Manhattan
*Clarence Lloyd Blew; Kansas City
Clara Elizabeth Blockcolsky; Manhattan
*Leon Leslie Blystone; Kanorado
*Walter C. Boller; Sedgwick
Orille Marietta Bourassa; Topeka
James Louis Bowers; Lawrence

Jesse Earl Bowers; Topeka
*William Bowers; Manhattan
Theodore Alexander Boyer; El Dorado
Ada Pearl Bradley; Wabaunsee
Walter Raymond Bradley; Manhattan
Ruth Dorothy Brandt; Manhattan
*Orval Albert Bricker; Kansas City
*Albert Lorraine Bridenstine; Manhattan
Joseph Oscar Brown; Sanford, Fla.
Leo Curtis Brown; Attica
Leroy Earle Brown; Attica
Margaret Alene Brown; Manhattan
Merdith Owen Brown; Greensburg
Albert Joseph Brubaker; Manhattan
Wesley Gordon Bruce; Clay Center
Esther Bruner; Manhattan
*Walter Scott Bryant; Rosedale
Hazel Effie Burdette; Severy
William Harold Burgwin; Manhattan
Bertha Ann Burk; Clifton
Earl F. Burk; Manhattan
Helen F. Burk; Manhattan
Odis Herschel Burns; Manhattan
Osceola Hall Burr; Manhattan
*Hiram Gilbert Burt; Garden City
Mrs. H. G. Burt; Garden City
Rex D. Bushong; Manhattan
Floy Caldwell; Manhattan
Vawn M. Caley; Ogden
*Matthew John Calto; Columbus, Neb.
Jamie Irene Cameron; Manhattan
*Sumner Hayes Cammack; McCune
*Amos Palmer Cannon; Salisbury, Md.
Myrtle Carey; Houston, Tex.
M. Louise Carleton; Cawker City
Sylvia Juliette Carlson; Manhattan
Sue Carmody; Manhattan
Florence Lydia Carnahan; Manhattan
Zattie Otellia Carp; Wichita
*Doyle Henry Carter; Trenton, Mo.
*Sylvester Ulric Case; Lyons
Ralph S. Casford; Bird City
*Edward H. Casinger; Kennett, Mo.
Myron Glenn Cassidy; Cassoday
Georgia Beatrice Chaffee; Belvue
Minnie Howell Champe; La Cygne
Edna Chapin; Manhattan
Robert Leslie Chapman; Paola
Etta Estella Chillson; Manhattan
*Otis Ray Christian; Manhattan
Frances Lee Clammer; Manhattan
Margaret Virginia Clammer; Manhattan
Florence Angela Clarke; Junction City
Lewis Chester Clark; Bendena
*Eugene Clevenger; Cato, Mo.
Charles H. Cloud; Winfield
Myrtle Irene Coleman; Centralia

* Under auspices of Federal Board for Vocational Education.

SUMMER SCHOOL—continued.

- Vera Jane Connors; Manhattan
 Kathleen Conroy; Manhattan
 C. F. Cool; Manhattan
 Christine Carol Cool; Manhattan
 Helen Lucille Cooper; Manhattan
 Silas W. Cooper, South West City, Mo.
 *Metheny John Copeland; Quinter
 Robert Francis Cople; Manhattan
 *Jesse Earl Coslet; Waverly, Mo.
 *R. R. Creamer; Dixon, Mo.
 Royce Brainerd Crimmin; Manhattan
 Claude B. Cross; St. George
 Mary Louise Crowder; Manhattan
 Simon Edward Croyle; New Cambria
 Rose Matilda Cunningham; Manhattan
 William E. Curry; Manhattan
 *Guiseppe Cutitta; Manhattan
 *Chester Reeves Damon; Hutchinson
 Bess May Danielson; Clyde
 Charles Deforest Davis; Manhattan
 Edgar William Davis; Lyons
 Josephine I. Davis; Morganville
 Frances Marie Dawley; Manhattan
 Helen Elizabeth Dean; Manhattan
 Mildred Dean; Nickerson
 Arthur R. Denman; Manhattan
 Laura Viola Denman; Manhattan
 Abbie Clair Dennen; Manhattan
 Howard Robert DeRose; Manhattan
 Gladys DeVore; Winfield
 Marguerite Luella Dickerhoof; Manhattan
 *Clyde Charles Dille; Beattie
 *Charles Orville Dirks; Latham
 *Robert Warren Diver; Humboldt
 Alta Mae Dobson; Manhattan
 Fred Hollister Dodge; Manhattan
 Earl Ralph Domoney; Downs
 Eula Ruth Donce; Narka
 Eva Burnadett Doonan; Manhattan
 Odessa Della Dow; Manhattan
 Charles Boddie Downer; Kansas City
 William R. Drennon; Manhattan
 *Noel Nardin Dunbar; Columbus
 *Arlie Duree; Leavenworth
 Mamie DuVal; Sedgwick
 Hazel Viola Dyer; Oberlin
 *Sidney Peter Eberhart; Topeka
 *Samuel M. Eby; Manhattan
 Lenore M. Edgerton; Randolph
 *Henry Reed Edmunds; Farmville, Va.
 *Clark Trevatan Eimer; Ottawa
 Inez Victoria Ekdahl; Randolph
 Bereniece Geraldine Elliot; Manhattan
 *Ross Smith Emmons; Joplin, Mo.
 *James Innis Endicott; Modena, Utah
 Minnie Laura Erdtmann; Ellsworth
 Agnes Elizabeth Ericksen; Manhattan
 Mary Rebecca Esdon; Manhattan
 Darrel Lee Evans; Manhattan
 Louise Helen Everhardy; Leavenworth
 Hobart Fairman; Manhattan
 Elsie Lucille Farrington; Manhattan
 *John Fred Feldhus; St. Louis, Mo.
 Virginia Fielding; Manhattan
 *Daniel Figg; Mathan, Iowa.
 *Charles Raymond Fitch; Miltonvale
 Alice Robertson Fitch; Manhattan
 Ruth Flanders; Ellsworth
 Gertrude Evelyn Flowers; Hastings, Neb.
 Daisy Boswell Floyd; Manhattan
 *Leo Gilbert Flynn; Rushville, N. Y.
 Gladys Evelyn Ford; Seneca
 *Frank Carl Foreman; Coldwater
 Robert Miles Forrester; Manhattan
 Virginia Lerlene Forrester; Manhattan
 Ralph Leon Foster; Courtland
 M. Eva Fox; Woodston
 *Charles Lincoln Foxworthy;
 Mountain Grove, Mo.
 Elizabeth Annys Fraser; Manhattan
 Herbert S. French; Corpus Christi, Tex.
 Edwin J. Frick; Manhattan
 *John Clarence Gard; Manhattan
 Walter D. Gardner; Kansas City
 Florence May Garinger; Manhattan
 Antonio Villancal de la Garza;
 Monterey, Mexico
 Charles Lionel Gastineau; Parsons
 *Jesse Conrade Geiger; Manhattan
 George Albert Gemmel; Manhattan
 Lee E. Geyer; Wetmore
 Laberta Ruth Ghormley; Partridge
 John Arthur Glaze; Manhattan
 George F. Glendening; Vermillion
 George McGrew Glendening; Manhattan
 Gertrude Glenn; Manhattan
 Marie Glenn; Manhattan
 Kelma Cleo Good; Manhattan
 *Clarence Raymond Gottschall; Manhattan
 Otis J. Gould; Manhattan
 Bonnie Mildred Graham; Wichita
 Virgil Thomas Graham; Hoyt
 Greta Hazel Gramse; Perry
 Chester Eugene Graves; Manhattan
 Hazel Louise Graves; Manhattan
 Marv Emily Graves; Manhattan
 *William E. Green; Fordland, Mo.
 Adeline Poston Groves; Kansas City, Mo.
 Clinton DeWitt Guy; Manhattan
 Cora Belle Hackler; Manhattan
 Charles Francis Hadley; Huntley, Ill.
 Edith Margaret Haines; Manhattan
 *Hugh Hancock; Huddleston, Va.
 *William E. Haney; Lawrence
 Walter Roy Harder; Minneapolis
 *Frank Hare; Dawn, Mo.
 *Dennis Kendall Harper; Manhattan
 George Andrew Harrah; Kansas City, Mo.
 Claude B. Harris; Havensville
 *Roy Charles Harrison; Manhattan
 Ernest Hartman; Manhattan
 Edith Agnes Hassinger; Parsons
 Ada Haukenberry; Manhattan
 Estella Haygood; Sulphur, Okla.
 Loren Bryce Hefling; Manhattan
 *Clyde Russell Hemphill; Chanute
 Francis Augustin Hennessy; Fulton
 *Jesse James Hennon; Sterling
 *Harvey Doughty Henschel;
 Kansas City, Mo.
 Alta Sarah Hepler; Manhattan
 Grace Herr; Medicine Lodge
 Chester Albern Herrick; Colony
 Lola Madge Herrick; Colony
 Maetta Ellen Herrick; Colony
 Walter Wesley Herrman; Warrenton, Mo.
 Caldwell Valdemar Hessin; Manhattan
 Randall Conrad Hill; Manhattan
 Reginald R. Hinde; Manhattan
 *Harley J. Hixson; Dearing
 *Orville Bryan Hoff; Kansas City, Mo.
 Glenn Oscar Hoffhines; Manhattan
 Irene Frances Hoffhines; Manhattan
 Jackson Wilbert Hofmann; Manhattan
 Edna Letha Hoke; Manhattan
 H. Juanita Hoke; Manhattan
 *William Gerald Holloway; Lecompton
 George Neely Holmes; Manhattan
 Grace Naomi Holt; Hoyt
 Ruth Louise Holton; Manhattan
 *Emil Henry Homolka; Manhattan

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SUMMER SCHOOL—continued.

- Dalton Ray Hooton; Manhattan
 *Earl Fremont Hoover; Manhattan
 *Lyle Ishmael Hoover; Normal, Ill.
 *Harold Dunbar Hopkins; Udall
 *Homer Allen Horn; Troy
 *Robert Horton; Weingarten, Mo.
 Clara Belle Howard; Colby
 David Marion Howard; Manhattan
 Sherman Hayes Howard; Chapman
 John Albert Howarth; Manhattan
 Hazel Dell Howe; Garrison
 Margaret Joye Howe; Garrison
 *Henry William Hoyer; Marysville
 Ruth Kathrine Huff; Chapman
 Carl Fountain Huffman; Manhattan
 Esther Alden Huling; Topeka
 *George F. Humphrey; Manhattan
 Louis Edgar Hutto; Manhattan
 *Herman Inmon; Hurlley, Mo.
 Bertha L. Jackson; Alma
 Geneva Mary Jackson; Topeka
 *Peter F. Jacobsen; Merrill, Iowa.
 *Howard V. James; Williamsburg, Va.
 Jerry Dillard Jarmon; Kansas City
 Hope Forrester Jenkins; Kingman
 *Harry Clayton Jennings; Manhattan
 Florence Gertrude Jewell; Goodland
 Anna May Johnson; Manhattan
 Ellen Elizabeth Johnson; Cleburne
 Mamie B. Johnson; Manhattan
 Merrill Nelson Johnson; Phillipsburg
 Edwin Loyd Jones; Wymore, Neb.
 *Francis N. Jordan; Manhattan
 Mildred Kaucher; St. Joseph, Mo.
 Elithe Electa Kaull; Kansas City, Mo.
 Wilma Lois Kaup; Riley
 *Thomas Bartholmeu Kelly; Kansas City, Mo.
 Sara Blanche Kershaw; Garrison
 Martha Helen Keyes; McPherson
 Foley K. Kiang; Manhattan
 *Russell Stanley Kifer; Springfield, Mo.
 Maud Chase Kilgore; Topeka
 Mary Marcene Kimball; Manhattan
 Julia King; Manhattan
 *Bertie Ray Kirkpatrick; Paradise
 Evelyn N. Kizer; Manhattan
 *Fred Kling; Scott City
 *Peter Knight; Savannah, Ga.
 Kathleen Knittle; Manhattan
 J. R. LaMont; Manhattan
 *Henry Clarence Lane; Mountain Grove, Mo.
 Ogilvie Miller Larimore; Clifton
 Clara Elvira Larson; May Day
 Homer Waldo Larson; Manhattan
 Vivian Hazel Larson; Beverly
 Golda Charlene LaShelle; Manhattan
 Helen Unnetta Lawrence; Junction City
 Velma Mary Lawrence; Manhattan
 Lavinia Liebengood; Paola
 Dorothy Lewis; Waterville
 Verda Cecil Lewis; Manhattan
 Florence Lucile Lingsweiler; Padonia
 Ching Sheng Lo; Canton, China
 Charles Dewey Logan; Manhattan
 Josie Long; Manhattan
 *Samuel Larman Ludlum; Chevy Chase, Md.
 Kai Lum Lung; Canton, China
 Grace L. Lyness; Walnut
 Hazel A. Lyness; Walnut
 Herbert W. McClelland; Manhattan
 Henrietta Vera McClelland; Manhattan
 Miriam Joy McClelland; Manhattan
 *Roy Dewey McClure; Hugoton
 Donald Ashley McConnell; Council Grove
 Leone Loritta McDonald; Plainville
 Junita Faye McHenry; Paola
 Anna Leah McIntyre; Topeka
 *James Clyde McKay; Kennett, Mo.
 Bess Jane McKittrick; Manhattan
 Clare McQuillan; Linn
 *Earl J. McWilliams; Alta Vista
 Franz Joseph Maas; Alta Vista
 Geneve Madden; Horton
 Alice Gertrude Magee; Manhattan
 *Wilbur S. Magill; Topeka
 Archie Lee Mahaffey; Pleasant Hill, Mo.
 Duella May Mall; Manhattan
 *William Henry Malone; Fort Scott
 *Lloyd Cecil Mann; Des Moines, Iowa
 *Claude Stanton Marshall; Gardner
 Daniel Claire Marshall; Ashland
 *Caries Earl Martin; Howard, N. C.
 Georgia Martin; Greenleaf
 Howard James Martin; Manhattan
 *Wilson Marion Martin; Dunavant
 Lola Lorraine Matter; Manhattan
 Hobart Irwin May; Manhattan
 *Henry J. Melcher; Concordia
 Virginia Messenger; Manhattan
 Clifford Graham Mickel; Irving
 Hazel Frazier Mickel; Irving
 *Oliver Harrison Mickey; Wichita
 Jean Frances Middleton; Manhattan
 *Cecil Sedgwick Miller; Manhattan
 *George D. Miller; Jefferson City, Mo.
 Helen Gould Miller; Manhattan
 Lloyd P. Miller; Imperial, Neb.
 Margaret Clay Miller; Manhattan
 Susan Esther Miller; Tarkio, Mo.
 Mattie Science Millines; Ardmore, Okla.
 *Elisha Paul Milton; Larned
 Byron Christian Mohrbacher; Manhattan
 Beatrice Pauline Moller; Manhattan
 Arthur Ryneer Morgan; Padonia
 *Clinton Hawthorn Morgan; Manhattan
 Charles Francis Morris; Wichita
 Hannah Swanwick Morrison; Newton
 Thomas Q. Morton; Prairie View, Tex.
 Johannes Frederick Theobald Mostert;
 Balfour, South Africa
 Joseph Linn Mullen; Clay Center
 Zenith R. Mullen; Labette
 *Benjamin Richman Mulnix; McPherson
 Minnie Gertrude Munger; Hoisington
 John Kenneth Muse; Manhattan
 Mary Grace Mustard; Manhattan
 Ona Vashti Muxlow; Manhattan
 *Harry Albert Myers; Americus
 Telie Edward Nafziger; McPherson
 Blanch Mae Nason; Wichita
 Harold Smith Nay; Manhattan
 *Orin Edward Nay; Manhattan
 Lloyd Bernard Neece; Hoyt
 Olga Floretta Neef; Manhattan
 *Eugene Neff; Salina
 *Alton Harry Neill; St. John
 *Carl Otto Nelson; Agenda
 Esther Olive Nelson; Agenda
 *Clell Ansel Newell; Matfield Green
 Grace Lee Newman; Rosedale
 *Robert Newman; Cassidy, Mo.
 Harry Emery Newton; Harper
 Helen Julia Nicholson; Lawrence
 Helen Nicolay; Manhattan
 *Owen Daten Nicolay; Osage
 Blanche G. Norby; Cullison
 *Oscar Marion Norby; Cullison
 Gustav Herman Oakes; Marquette
 Lillian Belle O'Brien; Manhattan
 Guy Oden; Sterling
 Loreito O'Donnell; Green

SUMMER SCHOOL—continued.

- *Walter Lee Ogden; Madison Heights, Va.
 Glenn William Oliver; Howard
 Louise Adeline O'Malley; Manhattan
 *Herbert Orville O'Neal; Nashville
 *Paul Harvey O'Neal; Dillon
 Alpha Irene O'Neil; Paola
 Ruby Elizabeth Orth; Manhattan
 William Joseph Overton; Lees Summit, Mo.
 Exene Owens; Manhattan
 Georgia Bell Owens; Kansas City
 Clementine Paddleford; Manhattan
 Florence Palmer; Hope
 Helen Parker; Overland Park
 Lillian Grace Parker; Marion
 Margaret Whitman Parsons; Arkansas City
 Amos Oliver Payne; Manhattan
 James Ernest Payne; Manhattan
 Nellie Maria Payne; Manhattan
 Suzanne Jeanne Payne; Manhattan
 Clara Cordelia Pennell; Junction City
 Earl Eugene Phares; Burlington
 Theresa Rossington Phillips; Leavenworth
 Hervey Phipps; Manhattan
 *John Newton Hagan Phlegar; Russell
 Eva Mildred Platt; Manhattan
 *Armer Porter; Fredonia
 Gwendolyn Irene Priest; Greenleaf
 *Joseph H. Prior; Manhattan
 Newton Q. Quan; Canton, China
 *Paul Severt Quick; Quick City, Mo.
 Jerry Thomas Quinn; Manhattan
 Karl Spangler Quisenberry; Newton
 Roland C. Ragle; Manhattan
 George Hemrod Railsback; Manhattan
 Elizabeth Randle; Riley
 *Alfred Lee Rapp; Americus
 Ruth Berneta Rathbone; Manhattan
 Grace Elizabeth Ratliff; Manhattan
 Wesley Philip Reazin; Macksville
 Edith Viola Reece; Riley
 Marion Capps Reed; Manhattan
 John Samuel Reid; Denison
 India Reinhold; St. Francis
 Agnes Jeanette Remick; Manhattan
 *William Edward Reynolds; Dupu, Ill.
 *Laurence Rhoads; Lane, Mo.
 Mary J. Rice; Greenleaf
 Archie Monroe Richards; Manhattan
 Mable Ferne Richards; Parsons
 Arthur Howard Riley; Minneapolis
 Carson Basil Roberts; Manhattan
 *Harold Moore Roberts; Greensburg
 *Millard Fillmore Roberts; Manhattan
 Norman Losey Roberts; Manhattan
 *Charlie Lee Robinson; Downs
 Howard Hardy Robinson; Washington
 Gladys India Roderick; Attica
 Kathryn Roderick; Manhattan
 Thomas Ewing Rodgers; Manhattan
 Clifford Leroy Roesener; Manhattan
 China Ethel Rogers; Manhattan
 Lydia Eugenia Rogers; Manhattan
 Walter John Rogers; Quinter
 *Claude Parke Rose; Prescott
 Louis Paul Ruppel; Auburn
 *Troy Rushing; Tylerton, Miss.
 *Arthur L. Russell; Peabody
 *Francis Herbert Russell; Opolis
 Mary Josephine Sachau; Manhattan
 Orra Salmon; Manhattan
 *Chris Michael Schlicher; Vassar
 *Harry Junior Schmidt; Kansas City, Mo.
 Miriam Harling Schmidt; Manhattan
 Henry William Schmitz; Alma
 Margaret Ursula Schneider; Manhattan
 Ethyle Emma Schoepflin; Lyndon
 Eliza Lucretia Scholer; Milo
 Grace Aurora Schwandt; Manhattan
 Myra Scott; Manhattan
 *Isaac Wesley Seamands; Joplin, Mo.
 Wilma Ruth Searson; Manhattan
 Nellie Margaret Sebring; Rossville
 Fanny Selanders; Garnett
 Malcolm Cameron Sewell; Manhattan
 *Edward Shaffer; Minneola
 Eva Leona Sharp; Chase
 Estella Barnum Shelley; Elmdale
 Ralph Jessup Shideler; Girard
 Lillian Hazel Shoff; Wichita
 Sidney B. Simmons;
 Tuskegee Institute, Ala.
 Marjory Hannah Simpson; Nowata, Okla.
 Leland Otis Sinderson; Manhattan
 Alice E. Skinner; Topeka
 *James William Skinner; LaHarpe
 Blanche Eudora Skipton; Narka
 Wilbur Nielson Skouruo; Manhattan
 Cecil Henry Slater; Manhattan
 Caroline Elizabeth Sloop; Nortonville
 *Charles Emmett Smith; Wassau, Va.
 Esther Boell Smith; Wamego
 Hester Elizabeth Smith; Manhattan
 Hester Alice Smith; Manhattan
 Sam J. Smith; Manhattan
 Wilber B. Spalding; Manhattan
 Helen Jewell Sparks; Manhattan
 Pearl Wartenbee Spratt; Axtell
 *Jesse Gaylord Stanton; Manhattan
 George Elmer Starkey; Syracuse
 Pires Ray Starkey; Hazelton
 Oscar Steanson; Manhattan
 *Jack Clyde Stewart; Alta Vista
 Mildred Ferne Stewart; Manhattan
 *Clyde E. Stout; Manhattan
 Everett Stroud; Holton
 *Ernest William Stuenkel; Lenora
 *Roy Stufflebeam; Fort Scott
 *Ernest Lewis Suddarth; Scottsville, Va.
 Abbie D. Swafford; Manhattan
 *Robert B. Swan; Wayside
 Charlotte Huntington Swanson; Manhattan
 Mabel Manghild Swanson; Manhattan
 *J. Frank Swarner; Hartford
 Stanley Carl Swenson; Manhattan
 Harry A. Swim; Manhattan
 Ethel Gladys Switzer; Emporia
 Harold Irwin Tarpley; Kansas City
 Etta Mae Tauer; Manhattan
 Mabelle La Vone Taylor; Zeandale
 Earl Hicks Teagarden; Manhattan
 *Daniel Teare; Manhattan
 *Fred Cass Teel; Manhattan
 Samuel I. Thackrey; Kansas City
 Corinne Bertha Thiele; Hanover
 Earl Emery Thomas; Argonia
 Edna Elizabeth Thomas; Detroit
 *James Fetter Thomas; Manhattan
 Lawrence Clifford Thomas; Clay Center
 *Virgil Perry Timson; Quasqueton, Iowa
 Marcia Edythe Tillman; Holton
 Ethel Alvina Toburen; Manhattan
 *Emile Aubrey Toms; Independence
 *Frank Raymond Townsend; Madison
 Eva Lucile Travis; Manhattan
 *Dick Lawrence Trego; Little River
 Yuk En Tseu; Kansas City
 Paul Tupper; Leocompton
 *Royal Newton Umphres; Manhattan

* Under auspices of Federal Board for Vocational Education.

SUMMER SCHOOL—concluded.

- Mary Laura Vaile; Junction City
 John Waldo Van Vliet; Manhattan
 *Eddie James Vermillion; Manhattan
 Belle Margaret Viers; Manhattan
 Ferdinand Voiland; Topeka
 Adelia Lavone Walker; Manhattan
 Mary Diantha Walker; Manhattan
 *Leo Sesory Ward; Manhattan
 Walter Glenn Ward; Silver Lake
 Logan Byron Warlick; Manhattan
 *Merle Burton Warner; Manhattan
 Frances Elizabeth Washington; Manhattan
 *Carl Otto Watson; Pittsburg
 Sheppard Arthur Watson; Eudora
 William Sewell Watts; Clay Center
 Henrietta Ella Webb; Tonganoxie
 Fred Egbert Weed; Athol
 Bertha Evelyn Wentworth; Furley
 Zoe Dorothy Wertman; Manhattan
 Edward Staunton West; Manhattan
 Julia Marian Westgate; Manhattan
 Edith Marie Wheatley; Rosedale
 *James M. Whitaker; Manhattan
 Wilton Parker White; Manhattan
 N. Francis Whitman; Kansas City
 Herbert Lawrence Wilkins; Manhattan
 *Francis Reid Williams; Broughton
 John R. Williams; Washington
 Roy Williams; Manhattan
 Eugene E. Willison; Manhattan
 *Cecil Cline Wilson; Canton
 *Lee Alfred Wilson; Milford
 Mildred Josephine Wilson; Alida
 *Murray A. Wilson; Baldwin
 William Clyde Wilson; Manhattan
 *Harry Lee Wobbe; Uniontown
 Ethel Frances Wood; Manhattan
 *Thomas J. Wood; St. Joseph, Mo.
 Margaret Woodman; Manhattan
 Maude Ellen Woods; Manhattan
 Blanche Woodward; Summerfield
 Ethel Mae Woodworth; Junction City
 Emma Gertrude Woolfolk; Topeka
 Lloyd Zimmerman; Manhattan

Students in Special Courses

The abbreviations following the names of students have the following significations: AMSC, automobile mechanics' short course; BSC, blacksmiths' short course; CSC, carpenters' short course; CCSC, commercial creamery short course; ESC, electrical short course; ETC, engineering trade course; FSC, farmers' short course; HSC, housekeepers' short course; MSC, machinists' short course; MilSC, milling short course; SA1, School of Agriculture, first year; SA2, School of Agriculture, second year; SA3, School of Agriculture, third year; SASp, School of Agriculture, special; TOSC, tractor operators' short course.

- Zenia Olivia Aberg (HSC); Scandia
 Edwin Ackerman (AMSC); Wauseon, Ohio
 *Asa James Adams (SA2); Clinton, Mo.
 Dale Smith Addy (SA1); Manhattan
 Mrs. Harry Adell (M); Manhattan
 *William Agee (SA1); Raymondville, Mo.
 *Erwin Aikens (SA1); Mayetta
 Theodore August Albright (AMSC);
 Woodbine
 Walker Reed Alexander (SASp); Ness City
 Marine Allen (MilSC); St. Louis, Mo.
 Paul James Allen (AMSC); Oklahoma City,
 Okla.
 Ralph Allen (AMSC); Wa Keeney.
 Wayne Allen (FSC); Burlington
 Glenwood Alley (SA2); Oxford
 Howard Vincent Alley (SA2); Oxford
 Joseph Frederick Altman (MSC); Dillon
 Charles Fletcher Anderson (FSC);
 Americus
 *Hugh Paxton Anderson (SA1); Norton
 Tilbert Anderson (SASp); McPherson
 *Buford Benjamin Angle (TOSC);
 Rocky Mount, Va.
 Adam Applegate (MSC); Luray
 *Frederick Roe Arnold (TOSC);
 Mercer, Mo.
 *Roscoe William Aspley (SA1); Abilene
 Archie Clinton Ashpole (AMSC);
 Great Bend
 Mrs. Elizabeth Askren (M); Manhattan
 *Chester Gladstone Aument (SA2);
 Superior, Neb.
 *William Stanley Austin (AMSC); Collyer
 *John Thomas Azbell (ETC);
 Fredericktown, Mo.
 Wallace Theodore Backman (AMSC);
 Axtell
 Howard Manning Bailey (TOSC);
 St. Francis
 Rolland Paul Baillod (SASp); Marion
 Frank Crowell Baker (MilSC);
 Kansas City, Mo.
 *Kenneth McKinley Baker (SA1);
 St. Paul, Minn.
 Roy Bainer (FSC); Scott City
 *Everett Wesley Baldwin (ETC);
 Topaz, Mo.
 *Edgar Lee Ball (SA1); Parsons
 Wilard Le Deoyt Ball (SA1);
 Kansas City, Mo.
 Raymond Elisha Banks (MSC); Salina
 Ruth Bardwell (SA2) Manhattan
 Arlene Barnes (M); Manhattan
 *Isaiah Isreal Baughman (ETC);
 Brandsville, Mo.
 Frances Baumgartner (HSC);
 Kansas City, Mo.
 Glen Alfred Beach (TOSC); Eskridge
 Laurence Becker (AMSC); Logan
 John Beckman (FSC); Gaylord
 *Frederick Bell (SA2); Kansas City

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STUDENTS IN SPECIAL COURSES—*continued.*

- Carrol Wellington Bellomy (TOSC);
Manhattan
- *Elmer Benefield (AMSC); Kingman
Clayton Stanley Bentley (SA2); Jerome
Ronald Spencer Bentley (SASp); Jerome
Bessie Ethel Beougher (HSC); Oakley
- *Glen Dennice Beougher (SASp); Oakley
- *Leith John Bergier (CSC); Downs
Ethel Mae Bergstrom (SA1); Windom
Mrs. Henry Besler (M); Manhattan
Gail Betts (SA2); Detroit
- *Adolph Louis Betz (TOSC); Alton, Ill.
Nathan Ricker Bickford (SA1) Bartlett
Dan Biegert (FSC); Junction City
- *Guy Cecil Bigelow (SASp); Peabody
Lawrence August Binder (FSC); Oakhill
Ernest Alwyn Bird (FSC); Hope
James Forrest Bird (TOSC); Fravel
Robert Stuart Bishop (SASp); Manhattan
- *Francis James Black (TOSC); Manhattan
- *Benjamin Robert Bockhaus (SASp);
Halstead
- *Walter Boller (SA2); Sedgwick
Nora Ann Borrer (HSC); Westphalia
- *William Bowers (ETC); Manhattan
- *Joseph Bowman (ETC); Seligman, Mo.
George Sylvester Boydston (SA1); Topeka
Theodore Boyer (AMSC); El Dorado
- *John Edward Boyle (SA1); Harlan, Neb.
- *Robert Bradshaw (SA1);
Blowing Rock, N. C.
Ransom Branch (SA1); Sterling
Garcel Irl Brenn (SA3); St. John
Velma Buchanan (M); Manhattan
Everett Allen Bretches (TOSC); Longton
Christina Lovina Brewbaker (SA2);
Manhattan
- Lewis Ransom Bridenstine (SA1);
Marienthal
- Joe Dudley Brickell (AMSC); Marion
- *Orval Albert Bricker (ETC); Kansas City
John William Briggs (SASp); Protection
Paul Jones Briggs (SA1); Protection
John Edwards Brooks (SA1); Hutchinson
Llewellyn Herbert Brooks (TOSC);
Burden
- *Frank Brown (ESC); Smith Center
- *Guy Brown (SASp); Bellaire, Iowa
Nellie Evelyn Bruning (HSC); Robinson
Omar Charles Bruning (FSC); Robinson
- *Walter Scott Bryant (ETC); Rosedale
George Buck (FSC); Meade
- *William George Burk (ETC); Malden, Mo.
- *Irwin Burris (SA1); McCune
Virgil Lowell Buster (SASp); Luray
Thomas Martin Butler (SA3); Glasco
- *Sumner Hayes Cammack (SASp);
McCune
- Benjamin Augustine Campbell (SA3);
Denison, Tex.
- *John Campbell (SASp); Campbell, Mo.
Mrs. O. C. Canary (M); Manhattan
Leo Francis Carey (FSC); Reading
Amelia Carlson (SASp); Overbrook
- *Arvid Carlson (SASp); Overbrook
Earl Thomas Carmichael (AMSC);
Langdon
- William Carmichael (TOSC); Manhattan
- *Doyle Henry Carter (SASp); Trenton, Mo.
George Hopkins Cary (SASp); Concordia
- *Edward Casinger (ETC); Kenneth, Mo.
- *John Cavender (ETC); Wellsville
- *Herbert Chapin (SASp); McPherson
- *Laurence Dewey Charboneau (ETC);
Beloit
- Loren Christensen (TOSC); Waterville
- *Otis Roy Christian (TOSC); Apache, Okla.
William Davie Christman (SASp); Wichita
Raphael Raul Cigna (AMSC); Vliets
Mary Gladys Clark (SASp); Manhattan
Wesley Whiffeld Clark (SASp); Jetmore
- *Eugene Clevenger (ETC); Cato, Mo.
- *Benjamin Coats (ETC); Lamar, Mo.
- *Joe Cobb (SA1); Manhattan
Alfred Earnest Coffin (AMSC); Scott City
Dwight Coffin (SASp); Salem, Ill.
Phillip Townsend Coffin (FSC); Scott City
Melvin Howard Cohoe (TOSC); Hazelton
Hugh Colhower (CCSC); Manhattan
Stephens Arvil Combs (FSC); Howard
James Robb Connery (BSC); Sterling
Ida Augusta Conrow (SASp); Manhattan
Bernard Conroy (SASp); Manhattan
Ignatius Donnelly Conroy (SASp);
Manhattan
- Harry Conzelman (TOSC); Republic
Ivan Murrell Conzelman (BSC);
Republic
- Robert Cook (SA2); Manhattan
Robert Stanley Coon (ESC); Manhattan
- *Thomas Newton Cooper (SASp); Fort Scott
- *Albert Lee Costello (SASp); Topeka
Roy William Coup (AMSC); Manchester
Elmer Clarence Covert (AMSC); Beloit
Harriett Marie Cowles (HSC); Lawrence
Lawrence Riley Crane (FSC); Baker
- *Ray Creamer (ETC); Dixon, Mo.
Georgia Mary Crowl (SA2); Manhattan
- *William Burbank Crowther (SA1);
Philadelphia, Pa.
- *James Curley (TOSC); Wichita
Carroll Earl Currie (TOSC); Gypsum
James Edwin Curry (FSC); Densmore
Carl Lee Curtis (TOSC); Moscow
- *Robert Lincoln Curtis (ETC); Stafford
- *Giuseppe Cutitta (ETC); Kansas City, Mo.
Henry Timothy Dahlquist (BSC); Garfield
- *Elton Marion Dailey (ESC); Garden City
Fred Earl Dakin (FSC); Drexel, Mo.
Roscoe Dale (FSC); St. Joseph, Mo.
Dorothy May Dapp (M); Fort Riley
Keith Burnett Davidson (SASp); Glasco
Rice Davies (FSC); Liberal
Elois Fayette Davis (M); St. George
- *Thomas Thompson Davis (ETC); Seneca,
Mo.
- Ambrose Seaton De Bard (SASp);
Arkansas City
- Jonas De Bard (SASp); Arkansas City
Alvin Matthew Delahunt (MSC); Olathe
- *Robert Irwin Dennis (ETC); Bucklin
Elsie May Dent (M); Manhattan
Adolphs Rodrigues de Sousa (CCSC);
Pelatas, Brazil
- Florence Lillian Dial (M); Manhattan
- Marion George Dickson (SASp);
Manhattan
- Bennie Henry Diehl (TOSC); Enterprise
Rita Hazel Dielmann (M); Winfield
- *John Alden Dimmitt (SA1); Brookville
Eva Christine Dittmar (M); Manhattan
- *John Francis Doane (SASp); Topeka
Mrs. Winona Hutto Dodge (M); Manhattan
- *Eslie Harry Dodson (ETC); Lone Tree,
Iowa
- Joe Doerfler (TOSC); Hays
Thomas Herbert Dollar (SASp); Mulberry
Louis Kay Dow (FSC); Chapman
John Donnelly (SASp); Clay Center, Neb.
Lottie Remington Dooley (HSC);
Manhattan
- Pearl Lee Dooley (HSC); Manhattan
- *Joseph Benton Douglas (SASp); Oskaloosa

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STUDENTS IN SPECIAL COURSES—continued.

- *George Washington Dowell (SASp);
Springfield, Mo.
Alan Metzler Downey (SA1); Manhattan
- *William Drennon (ETC); Topeka
Grace Parisa Dresser (FSC); Piper
James Deering Dresser (FSC); Piper
Harry Dreyer (AMSC); Kiowa
Harvey Dreyer (AMSC); Kiowa
George Wilson Duncan (FSC); Flush
- *Roy Oren Dundon (ETC); Junction City
- *Frank Alexander Dunlap (TOSC); Sterling
- *William Ray Dunn (ETC); Neck City, Mo.
William Dunnan (TOSC); Wright
Ada Dykes (HSC); Lebanon
Alfred William Dymock (FSC); Wichita
Lois Adeline Edgerton (M); Randolph
Vernon Morgan Edmiston (FSC);
Coffeyville
Bernice Edmonds (SA1); McLouth
Orval Egbert (FSC); Carlton
- *Clark Eimer (SA2); Ottawa
- *Olaf Victor Ecklund (TOSC); Scranton
Frank Shields Elliott (FSC); Reece
Orin Eugene Ellis (TOSC); Phillipsburg
- *Ross Smith Emmons (SA2); Joplin, Mo.
- *James Endicott (ETC); Modena, Utah
Arthur David Entz (FSC); Wichita
- *Francis Duncan Eshelman (ETC);
Springfield, Mo.
Frank Elijah Esrey (SA1); Manhattan
William Thomas Esry (SA1); Manhattan
Charles Esslinger (TOSC); Madison
Peter Esslinger (TOSC); Madison
William Estes (FSC); Walnut
Agnes Evans (M); Manhattan
Albert Carl Evans (TOSC); Fall River
- *Joseph Everett (SA1); Marston, Mo.
Ernest Ewing (BSC); Olathe
- *George Earl Faibley (SA1); Wakefield
Elsie Belle Fatzer (HSC); Fellsburg
Elmer Fatzer (FSC); Fellsburg
Clyde Garfield Fee (AMSC); Manhattan
Carl Fengel (FSC); Abilene
Anna Margaret Ferguson (SA2);
Marshall, Mo.
Louis August Fetsch (FSC); Marienthal
Ruth Barrett Fetzter (HSC); Manhattan
Raymond Victor Pickel (SA1); Earlton
Crete Spencer Fielding (M); Manhattan
- *Daniel Figg (ETC); Williamsburg, Iowa
Elsie Florence Finney (SA1); Ogden
Clements Fisher (TOSC); Hays
George Michael Fisher (SA2); Holton
- *Charles Raymond Fitch (SA2); Miltonvale
Arthur Fleharty (FSC); Fontana
- *Robert Fleming (SA1); Harlowton, Mont.
Anna Mae Fletcher (SA1); Manhattan
Grace Rebecca Foltz (SA3); Wakarusa
James Eugene Foote (AMSC); Fulton
Robert Miles Forrester (SASp); Manhattan
- *Thomas James Fowler (ETC);
Muscatine, Iowa
- *Charles Lincoln Foxworthy (ETC);
Mountain Grove, Mo.
Jennie Edith Francis (SASp); Manhattan
- *Samuel Robert Frederick (SASp);
Kennett, Mo.
Pearl Friend (HSC); Manhattan
Ray Glenn Fry (AMSC); Belleville
Mary Jane Fryar (HSC); Burrton
Carl Fuhrken (ESC); Denton
Raymond Edgar Fulcher (FSC); Piper
Cora Maude Fulton (HSC); Hepler
Robert Allison Galbraith (SA1)
White City
Carl Elworth Gardner (FSC);
Smith Center
- *Chester Clarence Gardner (SASp);
Kansas City
John Franklin Gaston (TOSC); Larned
John William Gehrke (FSC); Herington
Varvel Anna Gensler (SA1); McLouth
Josephine Malan Stuart Genzler (AMSC);
Leona
Vernon George (AMSC); Newton
Alfred Gigstad (SA1); Lancaster
- *Francis Henderson Gilbreath (TOSC);
Kansas City
Theodore Gill (SASp); Topeka
August Glahn (TOSC); Carlton
Edwin Kinsley Glover (SASp); Munden
Helen Isabell Gott (M); Arlington
Carl Graham (AMSC); Peabody
- *Oliver Grant (SASp); Romona, Mo.
Harry Albert Granzow (FSC); Herington
- *William Green (ETC); Fordland, Mo.
Earl Greer (FSC); Langdon
- *Reed Crawmer Greer (MilSC);
Kansas City, Mo.
Almon Grover (TOSC); Menlo
Frances Marie Guilbert (HSC); Manhattan
Guy McDowell Gunn (FSC); Great Bend
Walter Peter Gurtler (TOSC); Beattie
Lee Haas (FSC); Durham
Frank Alexander Hagans (SASp);
Manhattan
James Wren Hale (SASp); Eureka
Leaman Isaac Hamilton (TOSC);
Waterville
Oliver Otto Hane (AMSC); Miltonvale
Glenn Harold Hanes (CCSC); Towanda
Selmer Allen Hanson (FSC); Leona
Cecil Grimes Harden (AMSC); Circleville
- *Harold Orlin Harding (SASp); Lawrence
Guy Edward Harlow (TOSC); Beloit
- *Dennis Kendall Harper (ETC); Manhattan
- *Lloyd Ellsworth Harris (ETC);
Beaver Crossing, Neb.
Roy Charles Harrison (SA2); Satanta
Wilma Gwendolyn Hartley (SASp);
Manhattan
Carl Hartman (SA2); Manhattan
Frank Jay Harwood (AMSC); McLouth
Casper William Hassebrock (M); Riley
- *Verner Hasting (SASp); Alta Vista
Clarence Roscoe Hatfield (MSC); Hope
Gustav Herman Haubold (SASp); Paxico
- *Alvin Hawn (SA1); Tyro
George Wallace Hayes (MSC); Riley
Miriam Blanch Haynes (SA1); Manhattan
Winifred Harry Haynes (SA2);
Grantville
- *Otis James Heberly (TOSC); Minneapolis
*Raymond Heaton (ETC); Red Cloud, Neb.
Blenda Victoria Hedberg (HSC); Marquette
Claude Franklin Hedges (TOSC);
Cestos, Okla.
Everett Heiker (TOSC); Riley
Eugene Randles Hellstern (FSC);
South Haven
- *Egbert Kendall Henderson (MilSC);
Kansas City, Mo.
Victor Lewis Hendrickson (SASp);
Muscotah
- *Henry Henningsen (SASp); Salem, Ore.
*Jesse James Hennon (SA2); Sterling
Glenn Wellen Hepworth (SASp);
Manhattan
- *Jefferson Milton Hill (AMSC);
Los Angeles, Cal.
*Charley McKinley Hindman (SASp);
Coffeyville

STUDENTS IN SPECIAL COURSES—continued.

- William Urwin Hinshaw (TOSC); Kress, Tex.
- * Ira Francis Hites (MSC); Windom
- Mrs. Harley Hixson (M); Coffeyville
- * Harley James Hixson (SASp); Deering
- * Milton Louis Hoeffe (SA1); Highland, Ill.
- * William Calhoun Holder (SA1); Pleasant Hill, Mo.
- Theodore Roosevelt Holloway (SA1); Lecompton
- * William Gerald Holloway (SA2); Lecompton
- Erick John Holmdahl (SA1); Herndon
- * Francis Addison Holton (AMSC); Sparks
- * Emil Henry Homolka (ETC); Tescott
- Earl Robert Honeywell (SASp); Leoti
- * Lyle Ishmael Hoover (ETC); Normal, Ill.
- Carl Hopp (SA1); Oronogo, Mo.
- * Homer Allen Horn (SA1); Troy
- John Elton Horton (AMSC); Madison
- * Robert Horton (ETC); Weingarten, Mo.
- Chancy Hostetler (FSC); Harper
- Titus Hostetler (FSC); Harper
- * Robin Nicholas Houston (SA1); Charleston, Mo.
- * Henry William Hoyer (ETC); Marysville
- * Frederick Otterbine Humrick (SA1); Gaylord
- Charles William Hunter (CCSC); Eureka
- * Christopher Columbus Huntley (SA1); Lebanon, Mo.
- Arthur McKinley Hylton (TOSC); Council Grove
- Frederick Oswald Imhoff (FSC); Hanover
- * Herman Inmon (ETC); Hurley, Mo.
- * George Jacobs (SASp); La Crosse
- * Peter Jacobsen (ETC); Merville, Iowa
- Katherine Lenora Jelden (SA1); Columbus, Neb.
- * Charles Edwin Jennings (ETC); Chautauqua
- * Harrison Benjamin Jett (SASp); Kansas City
- * Carl Edward Johnson (SA1); Sharon Springs
- Lillie Marie Johnson (SASp); Walsburg
- William Johnson (TOSC); Hays
- George Roosevelt Jones (FSC); Eskridge
- John Jones (CCSC); Pittsburg
- Merton Emerson Karns (MilSC); Fort Scott
- * Albert Victor Kashka (AMSC); Beardsley
- Albert Frank Kast (TOSC); Manhattan
- Anita Pearl Kazmaier (HSC); Wellsville
- Albert Keehn (TOSC); Goff
- * Harry Elzworth Keener (SA2); Argonia
- Erwin Stockton Keim (TOSC); Whiting
- Mrs. Helen Keith (M); Manhattan
- Hulda Blackledge Keith (M); Manhattan
- Paul Weisner Keith (FSC); La Cygne
- * Harry Vernon Keller (TOSC); Kearney, Mo.
- * Thomas Bartholmew Kelly (ETC); Kansas City, Mo.
- John Kennedy (SASp); Junction City
- Herbert Adam Kinman (SASp); Kansas City
- * Jesse Ferdinand Kincheloe (ETC); Manes, Mo.
- George John Kittel (AMSC); Modoc
- John Kjellin (SA1); Manhattan
- * Arthur Louis Klein (SA1); San Marcial, N. Mex.
- * Fred Kling (ETC); Scott City
- Chester Klinkenberg (AMSC); Tonganoxie
- * Peter Knight (SA2); Savannah, Ga.
- * George Luther Knoblock (SA1); Burlington
- * Alexander Koehn (TOSC); McPherson
- Ernest Kohler (SA3); Forest Park, Ill.
- * Henry Gottlieb Kohrs (ETC); Dillon
- * Loyd Joseph Kostelecky (ETC); Milford
- George Leslie Krueger (SASp); Somers, Wis.
- Guy Otis Laird (MSC); Clay Center
- Clifford Lake (AMSC); Manchester
- * Henry Clarence Lane (AMSC); Mountain Grove, Mo.
- * Ward Langbehn (ETC); Topeka
- Lawrence Langardt (FSC); Dwight
- Ben Frank Langley (AMSC); Oskaloosa
- Clara Elmira Larson (SA2); May Day
- Thomas Larson (SA2); Kansas City
- Louis Lauritson (SASp); Kansas City
- * John Aturl Leach (SASp); Xenia, Ohio
- John Walter Lemler (SASp); Rice Lake, Wis.
- Ralph Hobart Leonard (FSC); Lyons
- Evan Shields Lewelling (AMSC); Delia
- Owen Winslow Lewis (AMSC); Hoisington
- * Frank Leyrer (SASp); Pittsburg, Pa.
- Poy Lim (SASp); Manhattan
- * Edgar Lindley (SASp); Manhattan
- Lyle Milton Lukens (TOSC); Beloit
- * John Fred Luthi (SASp); Junction City
- Guy Hiskett Lynch (AMSC); Isabel
- Rodney Harold McCollum (FSC); Elmdale
- * Roy Dewey McClure (ETC); Hugoton
- Mark Raymond McDonald (SA3); Plainville
- Edwin McFall (FSC); Oneida
- William Lloyd McFall (FSC); Oneida
- Carl Alder McHenry (AMSC); Rice
- Charles Wesley McHenry (SASp); Manhattan
- Faye McHenry (SA1); Manhattan
- Rosell James McIntosh (SA1); Manhattan
- Floyd Lester McIrvin (FSC); Geuda Springs
- Bernice Alice McKee (HSC); Rexford
- * William Henry McKee (SASp); Cedar Vale
- * Minno Smith McKenney (ETC); Valley Falls
- * Henry Mearle McKinney (SASp); Horton
- Jean Alfred McKove (FSC); Lawrence
- Paul Edmund McReynolds (TOSC); Plainville
- Robert Rhoades McVicar (SA1); Wichita
- Harriet Eleanor McMurray (HSC); Emporia
- Adolph Mall (CSC); Clay Center
- Ernest Jacob Mall (CSC); Clay Center
- * William Henry Malone (SA2); Fort Scott
- Minston Reuel Manley (SASp); Junction City
- * Lloyd Cecile Mann (ETC); Des Moines, Iowa
- Le Verne Manning (MSC); Clay Center
- Robert Mark (FSC); Madison
- Lee Webster Marshall (SASp); Manhattan
- * Carries Martin (ETC); Asherville, N. C.
- * Wilson Marion Martin (SA2); Dunavant
- Paul Erastus Massey (SA1); Vernon
- * Jessie Thomas Masterson (ETC); Kennett, Mo.
- Clarence August Mathein (SASp); Anthony
- Hazel Irene May (SASp); Manhattan
- * Fred Meisner (SA1); Cole Camp, Mo.
- Eugene Gates Melchert (FSC); Ottawa
- Doris Creiger Mellersh (HSC); Manhattan

* Under auspices of Federal Board for Vocational Education.

STUDENTS IN SPECIAL COURSES—continued.

- *Frank Lawrence Melville (AMSC); Philadelphia, Pa.
William Hozea Messenger (SASp); Manhattan
- *Oliver Harrison Mickey (SASp); Wichita
Orville Eugene Middleton (TOSC); Logan
John Palmer Milbank (MilSC); Chillicothe, Mo.
Alma Mae Miller (HSC); Manhattan
- *Cecil Miller (SASp); Manhattan
Clark Eugene Miller (AMSC); Dighton
Ellsworth Staley Miller (FSC); Oxford
- *George Dewey Miller (AMSC); Henley, Mo.
Wayne Allen Milligan (FSC); Coffeyville
Lawrence Leonard Milner (TOSC); Republic
- *Elisha Paul Milton (SASp); Larned
Lois Miner (HSC); Princeton
August Herman Moege (SA1); Reece
Frank Raymond Moffatt (AMSC); Mason, Wyo.
Robert Alexander Moll (SASp); Springfield, Mo.
William Thomas Molyneaux (FSC); Palmer
Emiliano Salvador Moreno (SASp); Pangasinan, P. I.
- *Alva Morris (SASp); Topeka
William Morris (CCSC); Kingman
Abbot Miles Morton (FSC); Oberlin
Lester Edison Morton (FSC); Oberlin
John Leo Motti (SA1); Wallace
Clyde Meryn Mounts (SA1); Manhattan
Eugene Lawrence Mullender (ESC); Waldo
- *Benjamin Richman Mulnix (AMSC); McPherson
Ona Vashiti Muxlow (SASp); Manhattan
Charles Nabb (SASp); Kansas City, Mo.
William John Nagel (FSC); Grand Junction, Colo.
- *John Napier (SA1); Joplin, Mo.
*Eugene Neff (ETC); Salina
*Alton Harry Neill (ETC); St. John
*Carl Nelson (SA2); Agenda
Clarence Russell Nelson (FSC); Clifton
Louise Nelson (SASp); Troy
Sadie Emelia Myrtle Nelson (SASp); Keats
Jennie Viola Nettrouer (SA1); Lost Springs
Charles Jacob Newman (TOSC); Virgil
- *Robert Newman (ETC); Cassidy, Mo.
Ray Nichols (AMSC); Stonington, Colo.
Glenn Albert Nickerson (SASp); Rexford
Albert Pomeroy Nicolay (MSC); Osage City
Ernest Lowell Nicolay (MSC); Manhattan
William Erwin Nickson (SASp); Nevada, Mo.
- *Owen Daten Nicolay (ETC); Osage City
Adolph Nissen (MSC); Wetmore
- *Joseph Henry Noennig (SA1); Marshfield, Mo.
Leslie Oberhelman (CSC); Valencia
Elmer Charles O'Connor (MSC); Fort Scott
Jesse William Olson (FSC); Chanute
John Andrew Olson (FSC); Junction City
Nels Peter Olson (SA2); Brookville
Virgil Levi Olson (FSC); Clyde
Henry John Oltjen (TOSC); Leona
- *Herbert Orville O'Neal (ETC); Manhattan
*Paul Harvey O'Neal (ETC); Dillon
*Earl David Ormsbee (TOSC); Smith Center
- Roy Lee Orr (AMSC); Utica
John Lewis Ott (SASp); Kinsley
- *Charles Calvin Osburn (SASp); Neodesha
Monette Meyer Parks (SA1); Manhattan
Merville Hugh Parlin (MilSC); Leavenworth
- *Fred Parrish (SA1); Ottawa
John Parrish (AMSC); Derby
*Clement Pharis Parsell (ETC); Glade
Dana White Parsons (CCSC); Arkansas City
Hallie Esther Pearson (HSC); Baldwin
Roy Pearson (TOSC); Clifton
Perly Raymond Pederson (TOSC); Clay Center
- *Fred Peoples (SA1); Elgin
William Fred Perkins (SASp); Oswego
Sophie Marie Peterson (SA1); Concordia
John Petracek (TOSC); Jennings
Edmond Ernest Peugnet (SASp); Edwardsville
Earl Phillips (AMSC); Emporia
Harold Phillips (FSC); Luray
Phoebe Elva Phillips (M); Manhattan
Myrtle Gladys Piper (SA1); Manhattan
Warren Alexander Piper (SA1); Manhattan
George Arthur Plahn (TOSC); Caldwell
Bernal Leroy Pontious (SA1); Paola
- *Armer Porter (SA2); Fredonia
John Sherman Posten (AMSC); Caldwell
Floyd Eugene Potts (TOSC); Hazelton
Ben Price (FSC); Reading
Dick Price (AMSC); Tulsa, Okla.
*Joseph Henry Prior (ETC); Case, Mo.
Jess Stanley Putman (CCSC); Winslow, Ark.
- *Loy Shelley Quimby (ETC); Great Bend
*Henry Patrick Quinn (SASp); Mitchells, Va.
Frank Raaf (TOSC); Gridley
*Russel Earnest Ragan (SA1); Blue Rapids
Leon Nicholas Ramm (CCSC); Baxter Springs
- *Simon Raper (SA1); Republic, Mo.
Rasmus Leonard Rasmusson (SA2); Lindsborg
- *Vernon Esko Ray (TOSC); Manhattan
*Earnest Rea (TOSC); Crane, Mo.
Glenn McKinley Reed (SASp); Galesburg
Edward Regier (FSC); White Water
Arthur William Regnier (FSC); Spearville
Walter Reh (AMSC); Homewood
Esther Lois Reiman (HSC); Byers
India Reinhold (SASp); St. Francis
Bishop August Renz (FSC); Kansas City
Oliver Wendell Rice (FSC); Muscotah
- *John Henry Richardson (SASp); Mountain Grove, Mo.
Oscar Richter (AMSC); Alma
Gladys Riddlebarger (M); Manhattan
*Francis Flovian Riegir (ETC); Bonner Springs
Hamilton Benjamin Riggs (SASp); Hutchinson
Alvin Verne Ritts (SASp); Topeka
Paul Eugene Ritts (SASp); Topeka
Lloyd Smith Roberts (SA2); Paola
- *Millard Fillmore Roberts (ETC); Marion
*Charley Lee Robinson (SASp); Downs
Frances Myrtle Robinson (SASp); Topeka
*Harry Roe (ETC); Hartford
Herbert Frank Roepke (FSC); Barnes
*Charles Thomas Rogers (SA1); Butler, Mo.
Samuel Nicholas Rogers (SA2); Manhattan
*Claude Parke Rose (ETC); Prescott

STUDENTS IN SPECIAL COURSES—continued.

- *Leroy Andrew Rose (SASp); New Cambria
 Clarence Rowe (SASp); Waldo
 Frank Ruder (BSC); Hays
 Rolland Lewis Rudolph (TOSC); Riley
 *Guy Pearl Rudy (ETC); Manhattan
 Joseph Rundus (TOSC); Blue Rapids
 Anton Rupp (TOSC); Hays
 *Troy Rushing (ETC); Tylertown, Mass.
 *Arthur LeRoy Russell (MSC); Peabody
 *Clifford Smith Russell (TOSC); Ellis
 *Francis Herbert Russell (TOSC); Opolis
 *Frank Lester Ryman (SA1); Independence
 Clarence Elliot Salisbury (AMSC);
 Lawrence
 Orra Salmon (SASp); Manhattan
 *John Brackett Sanders (SASp);
 Memphis, Mo.
 Lydia Esther Sandow (SASp); Dillon
 Glenn Sayers (CCSC); Benton Harbor,
 Mich.
 Harold Sargent (SA2); Manhattan
 Richard James Secenland (SA2);
 Manhattan
 *Leo Joseph Schilz (SA2); Fulton
 *Chris Michael Schlicher (ETC); Vassar
 Wilma Augusta Schoen (HSC); Downs
 Carl Otto Schmidt (TOSC); Chapman
 Rosey Mae Schrader (SASp);
 Council Grove
 *John Carl Schultz (SASp); Hornick, Iowa
 Fred Jacob Schwab (FSC); Keats
 Galen Schwandt (SA1); Manhattan
 Glen Schwandt (SASp); Manhattan
 Emil Fred Schwarz (TOSC); Gypsum
 Elma Pearl Scott (SASp); Elgin
 Simon Walter Scott (SASp); Kansas City
 Claude Wesley Scovel (TOSC); Jefferson
 *Isaac Wesley Seamands (ETC); Joplin, Mo.
 Edwin Emil Senne (AMSC); Alma
 Carl Ernest Seydell (SASp); Wichita
 *Guy Evert Sharer (TOSC); Salina
 Claude Burden Sheets (FSC); Lenora
 John Thomas Sherman (FSC); Leona
 *James Shirkey (SA1); Frankfort
 Harry Shoebrook (FSC); Horton
 Anna Belle Shoup (SASp); Devall Bluff,
 Ark.
 Robert Philip Silkman (SA1); Manhattan
 *Aaron Lloyd Simpson (SASp); Illmo, Mo.
 *George Taylor Smart (SA1);
 Cottontown, Tenn.
 Dorothy Virginia Smith (M); Manhattan
 Edwin Lewis Smith (SASp); Manhattan
 Houston Joseph Smith (SASp); Manhattan
 James Smith (TOSC); Logan
 Mary Smith (M); Manhattan
 *William Snyder (SASp); Cherokee, Okla.
 Edwin Sours (AMSC); Manhattan
 *Vern Everette South (ETC); Kansas City
 *Edward William Sparwasser (ETC);
 Glasco
 *Corwin Spencer (SASp); Oakley
 Chester Brook Spilman (SA1); Penokee
 Glen Joseph Srader (AMSC); Manhattan
 Lloyd Cleo Stafford (FSC); Oakland
 James Oscar Stanton (SA1); Wa Keeney
 *Jesse Gaylord Stanton (SASp); Wa Keeney
 Charles Lloyd Stauffer (TOSC);
 Valley Center
 *Cecil Joseph Steele (ETC); Doniphan, Mo.
 Robert Lester Stephens (SASp); Atchison
 Orlo Otis St. John (MSC); Leoti
 Victor Stolley (SA1); Denver, Colo.
 *Clyde Stout (SASp); Manhattan
 Ada Stowell (M); Vliets
 Leonard Curtis Straight (BSC); Bedford,
 Iowa
 Theis Erwin Streiff (TOSC); Dodge City
 *John Fred Strimple (SASp); Eureka
 Verni Martin Stromme (FSC); Le Roy
 Erma Elizabeth Strong (HSC);
 Blue Rapids
 *Jacob Strunk (TOSC); Dillon
 *Roy Stufflebeam (SA2); Fort Scott
 *Ralph Stumbaugh (SASp); Frederickton,
 Mo.
 George Edward Stutz (SASp); Manhattan
 *Ernest Lewis Suddarth (ETC);
 Scottsville, Va.
 Homer Lewis Sumners (SASp); Manhattan
 Ruben Bernard Sundgren (SASp); Sitka
 *Robert Burns Swan (SA2); Wayside
 Ellen Lenore Swanson (M); Manhattan
 Floyd Henry Swansen (TOSC);
 Overton, Neb.
 Roy Carl Swanson (TOSC); Axtell
 Lee Robert Swartz (SA1); Wichita
 Ethelyn Nordstrom Swenson (SASp);
 Manhattan
 Paul William Switzer (FSC); Hutchinson
 *Merle Edwin Taliaferro (ETC); Topeka
 Harry Tammen (TOSC); Pawnee Rock
 Fritz Hjahmor Tarnstrom (FSC);
 Lindsborg
 Clifford Owen Taylor (SA1); Newton
 Jacob Theodore Taylor (AMSC); Frankfort
 *Daniel Teare (ETC); Farmington
 *Fred Cass Teel (ETC); Manhattan
 Chester Arthur Teeters (TOSC); Kirwin
 *Lawrence Delbert Terry (ETC); Grenola
 Walter Clark Terry (FSC); Fellsburg
 Edmund Lee Thackrey (SA2); Manhattan
 *Erwin Tharp (TOSC); Alliance, Neb.
 William Henry Theil (AMSC); Alma
 Clarys Vesper Thomas (HSC); Topeka
 *Charley Admetus Thomas (HSC); Topeka
 Edith Evans Thomas (HSC); Cimarron
 *James Thomas (ETC); Marshalltown, Iowa
 Milton Monroe Thurow (TOSC);
 Macksville
 Ralph Victor Thurow (TOSC); Macksville
 *Virgil Perry Timson (ETC);
 Quasqueton, Iowa
 Edward Russell Tingley (AMSC); Dwight
 *Chester Tolle (SASp); Manhattan
 *Frank Raymond Townsend (SASp);
 Madison
 Earl Henry Treaster (TOSC); Beloit
 Della Adeline Tregt (HSC); Gem
 *Logan Rosco Tyson (ETC); Wichita
 *Royal Newton Umphres (SASp); Manhattan
 *Ralph Edward Upham (SASp); Ogden
 Leonard Linn Van Fossen (MilSC); Claffin
 Harold Van Horn (FSC); Greeley
 Philip George Van Meter (TOSC); Gypsum
 Lee Van Sickle (AMSC); Emporia
 William Henry Vaupel (AMSC);
 New Cambria
 *Henry Vehnekamp (TOSC);
 Monticello, Ind.
 Homer William Vickey (FSC);
 Geuda Springs
 William Von Waaden (FSC); Hanover
 Mona May Vogelmann (SA2); Clay Center
 Clyde McFarland Voshell (SA2); Bucklin
 Leo Voth (FSC); White Water
 *Cecil Augustus Waits (ETC); Cassoday
 *William Ethan Walker (SASp);
 Granby, Mo.
 William Irving Walker (SA2); Manhattan
 Melvin Claycomb Wallace (SASp);
 Eureka

* Under auspices of Federal Board for Vocational Education.

STUDENTS IN SPECIAL COURSES—concluded.

| | |
|---|--|
| Fred John Walter (FSC); Leocompton | Floyd Elmer Whiteley (TOSC); Abilene |
| Sydney Edward Walton (AMSC); Sterling | Avis Wickham (SASp); Manhattan |
| George Walz (AMSC); Hays | Fay Edith Wickham (SA2); Manhattan |
| Ferne Ward (SA2); Bancroft | *Earl Ray Williams (TOSC); Milan |
| *Leo Ward (ETC); Kiowa | Ide Harold Williams (FSC); Broughton |
| Ralph Wareham (SASp); Manhattan | *Lee Alfred Wilson (ETC); Milford |
| Ruth Harriet Warlick (SASp); Manhattan | Dan Winans (AMSC); Pratt |
| *Lester Earl Waters (SASp); Preston | Harry Franklin Winkler (FSC); Rozel |
| *Carl Otto Watson (SA2); Pittsburg | George Winzeler (FSC); Hilltop |
| Elmer Lawrence Watters (FSC); Marysville | Raymond John Wismer (SASp); Pomona |
| William Sewell Watts (MSC); Clay Center | Ray Glenn Withington (TOSC); Bogue |
| William Ernest Wehrman (FSC); White Cloud | *Harry Lee Wobbe (SA2); Uniontown |
| Charles Wehry (MSC); Peabody | *Joseph Howard Wolf (SASp); Sedalia, Mo. |
| Jacob Joseph Weinman (FSC); Olpe | Lucile Berry Wolf (M); Manhattan |
| *Lester Raymond Welch (MSC); Cherryvale | Bernie Wood (FSC); Manhattan |
| George Raymond Weller (TOSC); Kipp | Ethel Frances Wood (SA3); Manhattan |
| Frederick Wellman (FSC); Wichita | *Thomas Wood (SA1); St. Joseph, Mo. |
| Newell Ralph Wells (TOSC); Rose Hill | Clarence Johnson Worden (SA1); Woodston |
| Clinton Wells (SASp); Manhattan | *Claude Newton Yapple (SA1); Rago |
| Julia Marion Westgate (SASp); Manhattan | Henry Clay Young (FSC); Leavenworth |
| Waldo Eric Westman (SA1); Herndon | *Betista Anton Zappa (TOSC); Weir |
| *Leonard Jerome White (FSC); Kansas City, Mo. | Clarence Paul Zimmerman (SA1); Centerville |
| Urven Victor White (TOSC); Coldwater | Edward Joseph Zohner (MSC); Penokee |
| Cecil Ray Whiteley (TOSC); Abilene | Richard Stanford Parke Zolner (FSC); Pratt |

* Under auspices of Federal Board for Vocational Education.

* 1 Woman.

Students by States and Counties, 1920-'21

| | | | |
|---------------------|-------|------------------------|-------|
| Kansas | 3,018 | Montana | 5 |
| Alabama | 1 | Nebraska | 29 |
| Arkansas | 14 | New Jersey | 1 |
| California | 3 | New Mexico | 2 |
| Colorado | 18 | New York | 2 |
| Connecticut | 1 | North Carolina | 2 |
| Delaware | 1 | Ohio | 3 |
| Florida | 2 | Oklahoma | 36 |
| Georgia | 1 | Oregon | 1 |
| Kentucky | 2 | Pennsylvania | 6 |
| Idaho | 3 | South Carolina | 1 |
| Illinois | 12 | Texas | 20 |
| Indiana | 3 | Utah | 2 |
| Iowa | 11 | Virginia | 8 |
| Maryland | 5 | Washington, D. C. | 1 |
| Massachusetts | 2 | Wisconsin | 4 |
| Michigan | 1 | Wyoming | 4 |
| Mississippi | 2 | | |
| Missouri | 144 | Total | 3,371 |

FOREIGN COUNTRIES

| | | | |
|--------------|---|--------------------------|----|
| Brazil | 2 | Mexico | 2 |
| Chile | 2 | Philippine Islands | 5 |
| China | 8 | South Africa | 3 |
| Egypt | 2 | | |
| | | Total | 24 |

Grand total, 3,395

KANSAS COUNTIES

| | | | |
|-------------------|----|--------------------|-------|
| Allen | 26 | Linn | 15 |
| Anderson | 16 | Logan | 10 |
| Atchison | 25 | Lyons | 32 |
| Barber | 21 | McPherson | 43 |
| Barton | 18 | Marion | 29 |
| Bourbon | 23 | Marshall | 54 |
| Brown | 40 | Meade | 3 |
| Butler | 38 | Miami | 36 |
| Chase | 16 | Mitchell | 15 |
| Chautauqua | 22 | Montgomery | 28 |
| Cherokee | 9 | Morris | 2 |
| Cheyenne | 4 | Morton | 20 |
| Clark | 10 | Nemaha | 26 |
| Clay | 43 | Neosha | 17 |
| Cloud | 31 | Ness | 9 |
| Coffey | 17 | Norton | 16 |
| Comanche | 18 | Osage | 31 |
| Cowley | 60 | Osborne | 21 |
| Crawford | 18 | Ottawa | 24 |
| Decatur | 10 | Pawnee | 13 |
| Dickinson | 68 | Phillips | 18 |
| Doniphan | 22 | Pottawatomie | 34 |
| Douglas | 28 | Pratt | 22 |
| Edwards | 16 | Rawlins | 6 |
| Elk | 15 | Reno | 46 |
| Ellis | 14 | Republic | 20 |
| Ellsworth | 20 | Rice | 38 |
| Finney | 11 | Riley | 764 |
| Ford | 26 | Rooks | 8 |
| Franklin | 35 | Rush | 11 |
| Geary | 21 | Russell | 22 |
| Gove | 9 | Saline | 38 |
| Graham | 2 | Scott | 3 |
| Gray | 4 | Sedgwick | 105 |
| Greenwood | 36 | Seward | 10 |
| Hamilton | 3 | Shawnee | 93 |
| Harper | 35 | Sherman | 3 |
| Harvey | 29 | Smith | 16 |
| Haskell | 1 | Stafford | 24 |
| Hodgeman | 4 | Stevens | 2 |
| Jackson | 30 | Sumner | 30 |
| Jefferson | 39 | Thomas | 13 |
| Jewell | 11 | Trego | 9 |
| Johnson | 23 | Wabaunsee | 43 |
| Kearny | 1 | Wallace | 5 |
| Kingman | 16 | Washington | 35 |
| Kiowa | 6 | Wichita | 4 |
| Labette | 23 | Wilson | 19 |
| Lane | 1 | Woodson | 16 |
| Leavenworth | 22 | Wyandotte | 71 |
| Lincoln | 10 | | |
| | | Total | 3,018 |

Record of Attendance, 1863-1921

| Graduated..... | Total..... | Counted twice..... | Graduate..... | Senior..... | Junior..... | Sophomore..... | Freshman..... | School of Agriculture..... | Subfreshman..... | Preparatory..... | Special..... | Apprentice..... | Farmers' short course..... | Dairy, short course..... | Commercial creamery short course..... | Housekeeper, short course..... | Summer School..... | COLUMBIA Y.F.A.R..... |
|----------------|------------|--------------------|---------------|-------------|-------------|----------------|---------------|----------------------------|------------------|------------------|--------------|-----------------|----------------------------|--------------------------|---------------------------------------|--------------------------------|--------------------|-----------------------|
| 1863-64..... | 107 | | | | | | 14 | | | 93 | | | | | | | | |
| 1864-65..... | 113 | | | | | 8 | 14 | | | 90 | | | | | | | | |
| **1865..... | 150 | | | | 1 | 5 | 28 | | | 112 | | | | | | | | |
| 1866-67..... | 178 | | | 5 | 1 | 7 | 11 | | | 154 | | | | | | | | |
| 1867-68..... | 168 | | | | | | | | | | | | | | | | | |
| 1868-69..... | 170 | | | | 2 | 10 | 11 | | | 146 | | | | | | | | |
| 1870-71..... | 194 | | 1 | 5 | 5 | 7 | 13 | | | 164 | | | | | | | | |
| 1871-72..... | 202 | | 3 | 2 | 3 | 10 | 22 | | | 162 | | | | | | | | |
| **1873..... | *217 | | | | | | | | | | | | | | | | | |
| 1873-74..... | 183 | | | 6 | 3 | 14 | 24 | | | 136 | | | | | | | | |
| 1874-75..... | 143 | | | 2 | 2 | 10 | 26 | | | 103 | | | | | | | | |
| 1875-76..... | 232 | | | | | | | | | | | | | | | | | |
| 1876-77..... | 234 | | | | | | | | | | | | | | | | | |
| 1877-78..... | 150 | | | 5 | 5 | 23 | 42 | | | 75 | | | | | | | | |
| 1878-79..... | 207 | | | 12 | 16 | 89 | 89 | | | 1 | | | | | | | | |
| 1879-80..... | 276 | | 2 | 11 | 35 | 61 | 166 | | | 6 | | | | | | | | |
| 1880-81..... | 267 | | 2 | 9 | 24 | 48 | 178 | | | 1 | | | | | | | | |
| 1881-82..... | 312 | | | 11 | 19 | 50 | 227 | | | 5 | | | | | | | | |
| 1882-83..... | 347 | | | 12 | 30 | 60 | 241 | | | 4 | | | | | | | | |
| 1883-84..... | 395 | | 2 | 18 | 26 | 92 | 255 | | | 2 | | | | | | | | |
| 1884-85..... | 401 | | 5 | 16 | 36 | 71 | 271 | | | 2 | | | | | | | | |
| 1885-86..... | 428 | | 4 | 35 | 91 | 35 | 273 | | | 1 | | | | | | | | |
| 1886-87..... | 481 | | 10 | 44 | 24 | 100 | 303 | | | | | | | | | | | |
| 1887-88..... | 472 | | 2 | 46 | 27 | 92 | 305 | | | | | | | | | | | |
| 1888-89..... | 445 | | 7 | 28 | 41 | 103 | 266 | | | | | | | | | | | |
| 1889-90..... | 514 | | 10 | 63 | 28 | 105 | 307 | | | 1 | | | | | | | | |
| 1890-91..... | 593 | | 12 | 53 | 50 | 135 | 343 | | | | | | | | | | | |
| 1891-92..... | 584 | | 10 | 37 | 62 | 139 | 336 | | | | | | | | | | | |
| 1892-93..... | 587 | | 29 | 66 | 43 | 110 | 339 | | | | | | | | | | | |
| 1893-94..... | 555 | | 42 | 72 | 42 | 141 | 275 | | | 5 | | | | | | | | |
| 1894-95..... | 572 | | 39 | 89 | 64 | 108 | 276 | | | 3 | | | | | | | | |
| 1895-96..... | 647 | | 32 | 67 | 71 | 121 | 353 | | | 6 | | | | | | | | |
| 1896-97..... | 734 | | 46 | 69 | 62 | 163 | 321 | | | 67 | | | | | | | | |
| 1897-98..... | 803 | | 57 | 82 | 77 | 174 | 316 | | | 15 | | | | | | | | |
| 1898-99..... | 870 | | 40 | 92 | 65 | 177 | 306 | | | 40 | | | | | | | | |
| 1899-1900..... | 1,094 | | 27 | 69 | 109 | 163 | 376 | | | 50 | | | | | | | | |
| 1900-01..... | 1,321 | | 40 | 74 | 80 | 183 | 348 | | | 32 | | | | | | | | |
| 1901-02..... | 1,396 | | 32 | 65 | 120 | 206 | 396 | | | 19 | | | | | | | | |
| 1902-03..... | 1,574 | | 24 | 86 | 141 | 229 | 471 | | | 36 | | | | | | | | |
| 1903-04..... | 1,605 | | 20 | 114 | 161 | 206 | 403 | | | 33 | | | | | | | | |
| 1904-05..... | 1,462 | | 117 | 122 | 117 | 198 | 289 | | | 30 | | | | | | | | |
| 1905-06..... | 1,690 | | 30 | 145 | 110 | 214 | 373 | | | 46 | | | | | | | | |
| 1906-07..... | 1,937 | | 24 | 133 | 149 | 269 | 411 | | | 48 | | | | | | | | |
| 1907-08..... | 2,192 | | 26 | 148 | 202 | 357 | 450 | | | 42 | | | | | | | | |
| 1908-09..... | 2,308 | | 86 | 171 | 243 | 381 | 491 | | | 42 | | | | | | | | |
| 1909-10..... | 2,305 | | 26 | 170 | 286 | 417 | 456 | | | 89 | | | | | | | | |
| 1910-11..... | 2,407 | | 34 | 248 | 248 | 412 | 533 | | | 94 | | | | | | | | |
| 1911-12..... | 2,523 | | 44 | 288 | 261 | 461 | 337 | | | 85 | | | | | | | | |
| 1912-13..... | 2,928 | | 55 | 355 | 268 | 432 | 444 | | | 112 | | | | | | | | |
| 1913-14..... | 3,027 | | 64 | 324 | 327 | 431 | 516 | | | 129 | | | | | | | | |
| 1914-15..... | 3,089 | | 48 | 383 | 321 | 560 | 575 | | | 120 | | | | | | | | |
| 1915-16..... | 3,314 | | 76 | 401 | 305 | 605 | 484 | | | 175 | | | | | | | | |
| 1916-17..... | 3,340 | | 68 | 378 | 282 | 693 | 422 | | | 171 | | | | | | | | |
| 1917-18..... | 2,406 | | 36 | 294 | 239 | 483 | 231 | | | 138 | | | | | | | | |
| 1918-19..... | 2,991 | | 34 | 322 | 254 | 810 | 216 | | | 199 | | | | | | | | |
| 1919-20..... | 3,352 | | 43 | 300 | 269 | 894 | 224 | | | 271 | | | | | | | | |
| 1920-21..... | 3,395 | | 42 | 273 | 294 | 602 | 280 | | | 270 | | | | | | | | |

* Estimated. ** Calendar year.

College Enrollment, 1920-1921

| THE DIVISIONS | Men | Women | Total |
|--|--------------|--------------|--------------|
| The Division of Agriculture | 660 | 2 | 662 |
| Graduate students..... | 10 | | 10 |
| Seniors..... | 80 | | 80 |
| Juniors..... | 81 | | 81 |
| Sophomores..... | 121 | 1 | 122 |
| Freshmen..... | 200 | | 200 |
| Special students..... | 55 | | 55 |
| Students in Farmers' Short Course..... | 95 | 1 | 96 |
| Students in Creamery Short Course..... | 10 | | 10 |
| Students in Milling Short Course..... | 8 | | 8 |
| The Division of Veterinary Medicine | 74 | | 74 |
| Graduate students..... | 1 | | 1 |
| Seniors..... | 26 | | 26 |
| Juniors..... | 9 | | 9 |
| Sophomores..... | 21 | | 21 |
| Freshmen..... | 16 | | 16 |
| Special students..... | 1 | | 1 |
| The Division of Engineering | 923 | 1 | 924 |
| Graduate students..... | 1 | | 1 |
| Seniors..... | 47 | | 47 |
| Juniors..... | 95 | | 95 |
| Sophomores..... | 192 | | 192 |
| Freshmen..... | 277 | 1 | 278 |
| Special students..... | 33 | | 33 |
| Students in Short Course for Auto Mechanics..... | 66 | | 66 |
| Students in Short Course for Tractor Operators..... | 94 | | 94 |
| Students in other Engineering Short Courses..... | 35 | | 35 |
| Two-year Trade Course..... | 83 | | 83 |
| The Division of Home Economics | | 543 | 543 |
| Graduate students..... | | 8 | 8 |
| Seniors..... | | 71 | 71 |
| Juniors..... | | 69 | 69 |
| Sophomores..... | | 153 | 153 |
| Freshmen..... | | 192 | 192 |
| Special students..... | | 20 | 20 |
| Students in Housekeepers' Short Course..... | | 30 | 30 |
| The Division of General Science | 285 | 317 | 602 |
| Graduate students..... | 15 | 7 | 22 |
| Seniors..... | 18 | 31 | 49 |
| Juniors..... | 28 | 36 | 64 |
| Sophomores..... | 46 | 68 | 114 |
| Freshmen..... | 102 | 90 | 192 |
| Special students..... | 76 | 85 | 161 |
| The School of Agriculture (Secondary School) | 240 | 40 | 280 |
| Students in Agriculture..... | 90 | | 90 |
| Students in Mechanic Arts..... | 34 | | 34 |
| Students in Home Economics..... | | 21 | 21 |
| Special students..... | 116 | 19 | 135 |
| Students under jurisdiction of the Federal Board for Vocational Education (included in above figures)..... | 344 | | 344 |
| The Summer School | 259 | 345 | 604 |
| Totals..... | 2,785 | 1,248 | 4,033 |
| Duplicates..... | 423 | 215 | 638 |
| Net totals (not including lists cited below) | 2,362 | 1,033 | 3,395 |
| The Division of College Extension | | | 28,183 |
| Students in Credit Courses..... | | | 518 |
| Students in Vocational Courses..... | | | 249 |
| Individuals receiving three or more free Lesson or Instruction Sheets..... | | | 27,416 |

Home Study Service Students

(Instruction by Correspondence)

For the year January 1, 1920, to January 1, 1921, the new enrollments for credit courses numbered 518, and those for extension or vocational courses 249. These numbers do not include enrollments holding over from the previous year. During the same period there were sent out 5,190 lessons to stationary engineers, and 106,693 follow-up lessons.

In the following list of enrollments, those taking credit courses are indicated by (c), and those taking vocational courses by (e).

Mrs. Mayme W. Abernathy (c); Advance, Mo.
 John Accord (e); Hutchinson
 Mabel C. Adams (c); Garden City
 C. E. Agnew (c); Yates Center
 Cora Akers (c); Manhattan
 Harriet W. Allard (c); Manhattan
 Oscar B. Allen (e); Belle Plaine, Iowa
 Walter Allmand (e); Lenexa
 L. R. Alt (c); Mankato
 F. C. Altwood (e); La Cygne
 Mrs. Nellie Reid Anderson (e); Clayton
 Delmar Anderson (c); Phillipsburg
 Mildred Anderson (c); Delavan
 J. C. Anderson (c); Bennington
 Nelson J. Anderson (c); K. S. A. C.
 Violet Andre (c); Manhattan
 Minnie Archer (c); Logan
 C. D. Archer (e); Grenola
 Albert R. Ash (c); Kansas City, Mo.
 Jennie V. Askew (c); Utica
 G. A. Audruss (e); Elsmore
 Elmer R. Auseum (c); Manhattan
 R. A. Axtell (c); Dimmitt, Tex.
 John Ayars (c); Keats
 Harvey C. Baird (e); Dodge City
 H. T. Baker (c); Tonganoxie
 W. E. Baldrige (c); Protection
 Edna Baldwin (c); Seneca
 A. R. Barger (e); Mont Ida
 C. L. Barker (e); Topeka
 H. A. Barner (e); Westphalia
 W. J. Barr (c); Larned
 Alma Bauresfeld (c); Yates Center
 Merl E. Beard (e); Wichita
 Paul Beck (c); Winfield
 Merle Beevers (e); Hamilton
 Joe Bell (e); McDonald
 Earl G. Bennett (e); Eskridge
 Albert Bennett (e); Caruthersville, Mo.
 F. Benninghoven (e); Strong
 Virgil Benton (e); Merriam
 G. R. Benz (e); Merriam
 Gail Betts (c); K. S. A. C.
 Edward Bergstrom (e); Cuba
 S. W. Black (c); Columbus
 Ray Black (c); Wellington
 Robert Blanks (c); Emmett
 Edna Bloom (e); Liberal
 Willis Maude Blunk (c); Burlington, Wis.
 Walter H. Bohmenblust (c); Riley
 Albert Boothe (e); Colfax, Iowa
 Arthur Boren (e); Hannibal, Mo.
 Anna Botsford (c); Manhattan
 James Bowers (e); Lawrence
 W. W. Bowman (e); Pawnee Rock
 Nelson Boyle (c); Webster
 Henry B. Boyer (e); Manhattan
 Emma Brelsford (c); Jennings
 Walter C. Bretzman (e); St. Louis, Mo.
 Gilbert C. Briggs (e); Sedan
 Bros., Errebo (e); Vesper
 Howard Brown (c); Riley
 Frances A. Brown (e); Leavenworth
 Willard Q. Brown (e); Sergeant Bluff, Iowa
 Grace M. Brown (c); Pomona
 Merdith O. Brown (c); Greensburg
 Fred B. Browne (e); Burdett
 Frances Brumbaugh (c); Vesper
 Claude Bucknell (e); Hardy, Neb.
 Phyllis Buitis (c); Manhattan
 A. P. Bumstead (e); Corona, Cal.
 Arthur P. Bumstead (e); Corona, Cal.
 Emily Burgen (c); Seneca
 Leslie Burger (c); Seneca
 Walter Burling (c); Arlington
 L. O. Burton (e); Arkansas City
 Georgina Bush (c); Little River
 Herbert Butler (e); Scranton, Iowa
 A. C. Bux (c); Harrisburg, Ark.
 C. D. Calogieris (c); Manhattan
 C. Harold Camahan (c); Randlett, Okla.
 J. I. Cameron (c); Manhattan
 Louise Camp (c); Alamosa, Colo.
 D. R. Campbell (e); Manhattan
 M. E. Campbell (e); Wa Keeney
 S. E. Campbell (e); Wa Keeney
 S. D. Capper (c); Manhattan
 Mrs. M. W. Carkon (c); Manhattan
 E. A. Carlgrin (e); Scandia
 Zattie Carp (e); Wichita
 Mabel Carlile (c); Turon
 Vernon Carter (c); Hiawatha
 Ida Pearl Carr (c); Anthony
 Chas. Lee Cavanogh (c); Perry
 L. T. Cawthon (e); Duquoin
 Walter Cederberg (e); Herndon
 R. K. Chambers (e); Milford
 Levi Chapin (e); Glidden, Iowa
 Francis E. Charles (c); Republic
 Mildred Churchill (c); Manhattan
 Nita Clark (c); Wichita
 Marguerite Clark (c); Riley
 Gus Claussen (e); Bunkerhill
 O. H. Clark (e); Overbrook
 Carlos W. Cleary (c); Stafford
 Mahala Clement (e); Hiawatha
 R. E. Cleland (c); Manhattan
 C. H. Cloud (c); Douglass
 Otto R. Coburn (c); Preston
 Maude M. Coe (c); McPherson
 R. F. Coffey (c); Iola
 Thelma Coffin (c); Le Roy
 Drusilla Coffin (c); Ackerland
 J. Calvin Coffman (c); Overbrook
 Bessie O. Cole (c); Kinsley
 Kenneth B. Collins (e); Junction City
 Mrs. Jno. Conzelman (e); Republic
 Grace Cott (c); Bucklin
 Harry Coope (e); Washington, D. C.
 A. H. Cornwell (e); Wichita
 Herman Cortelyou (c); Caldwell
 John F. Costello (c); Junction City

HOME STUDY SERVICE STUDENTS—*continued.*

- Frank Craig (e); Natoma
 V. S. Crippen (e); Pratt
 R. B. Crimmin (c); K. S. A. C.
 Arthur M. Crocker (c); Bazaar
 Claude B. Cross (e); St. George
 M. M. Culver (e); McClure, Ohio
 Elsie Cuthbert (e); Topeka
 C. O. Dailey (e) (c); Stanberry, Mo.
 John H. Daniels (e); Wichita
 Dorothy Mae Daniel (c); Walnut
 Chas. D. Davis (e); Mullinville.
 David D. Davis (e); Elmdale
 C. D. Davis (c); Manhattan
 David C. Daw (c); Salina
 Mildred Dean (c); Nickerson
 Anna M. DeBold (e); New Cambria
 David P. Dick (e); Inman
 Eveleen Dittmer (c); Chase
 Geo. F. Dodge (e); Fort Scott
 Edw. C. Doerschlog (e); Arnold
 Bruno Doerr (e); Barnes
 Claire A. Downing (c); Independence
 M. V. Dunlap (e); Osawatomie
 Alma E. Dusenberry (e); Ionia
 Chas. Ebenstein (c); Independence
 Chas. M. Edgerton (e); May Day
 Doryce Edwards (e); Valencia
 Allison Edwards (c); Herington
 Samuel T. Elordy (e); La Redonda, Mexico
 Eleanor D. Encell (c); Howard
 Nellie Ensign (c); Waterville
 Mrs. Ella Enslinger (e); Moran
 Anna Erikson (c); Junction City
 R. A. Esdon (c); Chase
 Daniel Evans (c); Manhattan
 Neal Evans (e); Jewell
 Mrs. Ernest J. Ewing (e); Wiseton, Canada
 Hattie Fansler (c); Junction City
 Mrs. E. F. Farmer (e); Attica
 Mr. E. F. Farmer (e); Attica
 W. E. Farrar (e); Arkansas City
 J. W. Farrar (e); Arkansas City
 Mr. Everett Fawkes (c); Greeley
 John A. Fay (e); Seattle, Wash.
 Emma Fecht (c); Manhattan
 Ben Fields (e); Beaumont
 W. L. Fink (e); Raymore, Mo.
 Grace Fite (e); Benedict
 Don E. Fitz Gerald (c); Belleville
 Robert Fitz Gerald (e); Jackson, Mo.
 Gladys Flippo (c); K. S. A. C.
 Conie Foote (c); Downs
 Robt. Forsythe (e); Centerville, Iowa
 Mrs. B. Forrester (c); Manhattan
 Addison Forrester (c); Manhattan
 W. E. Forney (c); Augusta
 Hubert Forney (c); Turon
 Stella Foster (e); Topeka
 Ralph L. Foster (c); Little Rock, Ark.
 D. M. Frantz (e); Quinter
 W. L. French (e); Vinland
 Mrs. Lela M. Freimuth (e); Tonganoxie
 Roy T. Frisbie (e); De Soto
 Julia E. Frisbie (c); Topeka
 Waldron L. Fry (e); Sioux City, Iowa
 E. H. Fulhage (e); Garfield
 Claude A. Fulk (e); Clarinda, Iowa
 Chas. G. Fulkerson (c); Irving
 Gammell Bros. (e); Council Grove
 John C. Gard (c); Manhattan
 W. D. Gardner (c); K. S. A. C.
 Ethel Garrett (c); Manhattan
 Noble G. Garrett (e); Wakarusa
 Clyde Garberson (c); Wellington
 Mrs. Florence Garinger (c); Manhattan
 C. L. Gastineau (c); Parsons
 C. F. Gatz (c); K. S. A. C.
 W. A. Gearn (e); Harrison, Ark.
 Freda Geffert (c); Barnes
 Lee E. Geyer (c); Corning
 Ruth Ghormley (c); Manhattan
 Garrett P. Gibbons (e); Sioux City, Iowa
 Virginia Giles (c); Thomasville, Mo.
 G. R. Gilkerson (e); Seneca
 Mrs. A. E. Gledhill (e); Gaylord
 Irene Glenn (c); Manhattan
 Clara Goodrich (e); Stockton
 Arthur Goodwin (e); Burns
 George G. Gove (c); Junction City
 Gus Graves (c); Greeley
 R. W. Graham (c); K. S. A. C.
 Walter W. Graham (c); Manhattan
 Geraldine Gregg (c); Abilene
 John W. Guerner (c); Coffeyville
 Gustave Guetlech (e); Bay Port, Mich.
 Bertha M. Gwin (c); Washington
 F. A. Hagans (e); Manhattan
 F. L. Haggard (c); K. S. A. C.
 Chas. M. Hallett (c); Cabool, Mo.
 Eunice Hamm (e); Grantville
 Frank Halva (e); Cedar Rapids, Iowa.
 Claudie Hansen (e); Jamestown
 R. H. Hansen (e); Jamestown
 W. P. Hardwick (e); Benkelman, Neb.
 Ruth Harrison (c); Jewell
 Landon Hardman (c); Lenora
 James H. Hart (c); Kansas City
 John Hart (c); Louisburg
 Maud L. Harwood (c); Amsterdam, Mo.
 Ruth A. Harding (c); Marion
 Mrs. L. P. Hartzell (e); Rossville
 Walter R. Harden (c); K. S. A. C.
 Pauline C. Hattshorn (c); Logan
 Elmer G. Hawks (c); Hiawatha
 Harry A. Hawry (c); Moundridge
 John A. Hawrath (c); K. S. A. C.
 Mrs. Ada Hawkenberry (c); Manhattan
 Margaret C. Hawk (e); Topeka
 Wm. R. Hays (e); Pleasant Hill, Mo.
 C. S. Hay (e); Ottawa
 Raymond Heaton (e); Red Cloud, Neb.
 H. M. Herrold (e); Utica
 H. H. Henry (e); Mahaska
 Erna Hernberger (c); Buffalo
 Bertha Hiatt (c); Esbon
 Maude Hiatt (c); Reamsville
 Dick Higgins (c); Logan
 Gilbert Higholt (e); Stanley, Wis.
 Tom Hillman (e); Quenemo
 J. M. Hillman (e); Quenemo
 Martin Hiner (e); Esbon
 Francis Hites (e); Manhattan
 Brom D. Hixson (c); K. S. A. C.
 W. E. Hodgins (e); Belleville
 Lester H. Hoffman (c); Abilene
 Jackson Hofman (c); Manhattan
 Edna L. Hoke (c); Manhattan
 Ola M. Holland (e); Geuda Springs
 O. L. Holmdahl (e); Herndon
 Roscoe S. Holton (e); Alden
 Milton Holtsclaw (c); Longton
 Nellie Hord (c); Colony
 Marcus J. Holthuson (e); Topeka
 Frank I. Hooker (e); Guide Rock, Neb.
 Edna Howe (e); Downs
 John Louis Hoxsey (c); Roxbury
 Sarah Belle Hyde (c); Altoona
 Ira E. Hull (e); Zenith
 Geo. T. Humphrey (c); K. S. A. C.
 A. J. Hurt (e); Columbus
 F. A. Hurt (e); Westphalia
 Genevieve L. Hurley (e); Meriden
 A. Hurlgen (c); K. S. A. C.
 E. H. Ingersoll (c); Overbrook
 Esther Witwer Irwin (e); Topeka
 Nellie B. Jacobs (c); Manhattan
 E. L. Jacobs (e); Claflin

HOME STUDY SERVICE STUDENTS—continued.

- D. L. Jantz (c); Larned
 Jane Jenkins (c); K. S. A. C.
 D. B. Jenkins (e); Jewell
 Howard A. Jester (e); Vliets
 Edna Johnson (e); Roxbury
 Edward Johnson (e); Topeka
 Claud M. Johnson (c); Severy
 French E. Johnson (e); Kansas City, Mo.
 Hugo W. Johnson (c); Weskan
 Sidney C. Johnson (e); Rantoul
 Minnie Johnson (e); McPherson
 Arnold R. Jones (c); Haddam
 Hazel Jordan (c); Gering, Neb.
 Helen Caroline Kahn (c); Emporia
 Ivan Kankel (c); Baldwin City
 Elithe E. Kanee (c); Wynne Wood, Okla.
 Edward Keeman (e); Seward
 Mabel Irene Kenyon (c); Salina
 Gladys Kemp (c); Logan
 Thos. W. Kerfoot (c); Slater, Mo.
 Alois Kese (c); Belleville
 R. C. Keys (c); K. S. A. C.
 Lillian Kienast (c); Manhattan
 Chester A. King (c); Manhattan
 E. L. Kingsbury (c); Arkansas City
 Nina Kirkwood (c); Marysville
 Mrs. P. W. Kirkpatrick (c); Marysville
 C. E. Kirlin (e); Beattie
 Harriet Klaver (c); Kingman
 Wm. F. Klosterhoff (e); Bridgeton, Mo.
 Harold L. Klug (e); Cedar Rapids, Iowa
 Milos F. Knedlik (e); Hanover
 Harry C. Koehler (c); Marion
 John Koster (c); Manhattan
 Geo. J. Kurtz (e); Westphalia
 Mr. Orie Lacey (c); Greeley
 Mrs. Ethel B. LaMont (c); Manhattan
 Mrs. J. R. LaMont (c); Oberlin
 B. F. Latshaw (e); Coats
 Franz R. Lawson (e); Leonardville
 Elizabeth Leach (c); Princeton
 Geo. O. Learned (e); Stafford
 Lewis Leonard (c); Solomon
 Clyde L. Lester (e); Topeka
 Katie Levendofsky (c); Belleville
 Martha Levendofsky (c); Belleville
 E. E. Lewis (e); Onaga
 Harry Lewis (c); Manhattan
 Ira W. Lewis (e); Downs
 Viola M. Lienard (c); Eskridge
 Warren J. Lincoln (e); Wichita
 L. C. Loche (e); Delphos
 Archie A. Lockman (c); Dodge City
 J. G. Lofty (e); Belleville
 C. D. Logan (c); K. S. A. C.
 Alice Lohse (c); Logan
 J. Chester Long (c); Manhattan
 S. P. Loomis (e); Lost Springs
 Linn W. Loughridge (e); Midian
 Leo Luker (e); Ellinwood
 Frank Lund (e); Alma
 Norman D. Lund (c); Protection
 Olivet Lungren (c); Ogden
 Donald Lynch (e); Atlantic, Iowa
 Alice Magee (c); Manhattan
 J. L. Maldoon (e); Marysville
 O. E. Mann (e); Leavenworth
 Ethel Manwarren (c); Manhattan
 A. D. Markely (c); Minneapolis
 Mr. C. F. Markley (c); Sedgwick
 Helen Martin (c); Harper
 Ethel Martin (c); Turon
 T. Martin (c); Bala
 Nellie Martin (c); Holton
 Vola Ruth Martin (c); Chandler, Okla.
 Leona Martin (c); Lutie, Okla.
 Alice Martin (e); Kohala, Hawaii
 J. F. Marvin (e); Manhattan
 H. E. Mather (c); Manhattan
 R. E. Mathew (e); Centralia
 Erwin W. Mayer (e); Marcus, Iowa
 Thelma McCord (c); Junction City
 Hazel McConnell (e); Randall
 W. Clarence McBride (e); Dunavant
 James E. McClain (e); Topeka
 Donald McConnell (c); Goff
 Nona McCarty (e); Topeka
 F. A. McCoy (e); Penokee
 Wm. Howard McClure (c); Greeley
 Charles McClure (c); Greeley
 Mae Ann McColve (c); Onaga
 Carroll McDonald (c); K. S. A. C.
 Geneva McDaniels (c); Scottsville
 Harold McGinley (c); K. S. A. C.
 James C. McKay (c); K. S. A. C.
 John David McKean (c); Scott City
 P. Means (c); Protection
 R. E. Means (c); Protection
 D. J. Meisenheimer (e); Garnett
 Elizabeth Meinholdt (e); Topeka
 Dorris L. Mell (c); Wetmore
 Henry J. Melcher (c); K. S. A. C.
 Ethel Mendenhall (c); Oil City
 Warren Merrill (e); Le Roy
 A. L. Meserve (c); Ellis
 Lawrence Vare Metre (e); Copeland
 Margaret B. Meyer (c); Riley
 Roxie E. Meyer (c); Wamego
 Clifford Mickel (c); Irving
 Lloyd Miller (c); Imperial, Neb.
 Lena Miller (e); Salina
 Marguerite Miller (c); Cascade, Colo.
 Katherine Miller (c); Oil City, Pa.
 Gerald Miller (e); Kismet
 E. L. Miller (e); Oxford
 Mertie Mills (c); Densmore
 Guy V. Milver (e); Belleville
 Mrs. Hattie Mitchell (c); La Crosse
 Fern L. Mitchell (c); Wellington
 F. W. Moehlman (e); Manhattan
 Earl L. Momill (e); Fowler
 Alice Montgomery (c); Weldona, Colo.
 A. O. Moore (e); Zeandale
 Earl A. Moody (c); Salina
 L. B. Morris (c); Paxico
 Hannah Morrison (c); Newton
 Mrs. Lonberta Morrison (c); Overland Park
 Mrs. Lola Morgan (e); Manhattan
 Edith Muir (c); K. S. A. C.
 Stella C. Munger (c); Hattiesburg, Miss.
 Barbara E. Murray (c); Ash Grove, Mo.
 Ralph Myers (c); Belleville
 Helen Myers (c); Burns
 T. E. Nafziger (c); McPherson
 Olga F. Neef (c); Manhattan
 Lloyd B. Neece (c); Hoyt
 William A. Naher (c); Kansas City, Mo.
 Claude Neibling (c); Hiawatha
 Gladys C. Neilson (e); White City
 Harry Nelson (c); Wakarusa
 Clifford Nelson (c); Ellis
 Pearl J. Nelson (e); White City
 C. A. Neuber (e); Milford
 Dietrich Neufeld (e); Buhler
 Arthur Newby (e); Walled Lake, Mich.
 Schuyler Nichols (e); Herington
 Mrs. Morris Nielson (e); Atchison
 Morris Nielson (e); Atchison
 Joseph Nuiths (c); Tipton
 Frank O'Daniel (e); Pottawatomie
 Dorothy O'Leary (c); Fredonia
 Arthur Olson (e); Manhattan
 Oscar L. Olson (c); Sedan
 Glenn W. Oliver (c); K. S. A. C.
 John G. Olson (e); Van Hook, N. Dak.
 Edlena O'Neil (c); Kansas City, Mo.

HOME STUDY SERVICE STUDENTS—*continued.*

- Myril Osborne (e); Courtland
 Mrs. F. W. Osterhout (e); Lansing
 D. L. Ostlind (e); Clyde
 Harry D. Ostlind (c); McPherson
 G. Keeley Paul (e); Abilene
 Inez Paulsen (e); Jamestown
 Margaret Payne (c); Fontana
 Reno Payne (c); Parker
 Floyd Peckrell (c); Mulvane
 Henry P. Peebles (c); Kansas City
 B. F. Pfister (c); K. S. A. C.
 L. T. Perrill (e); Sylvia
 Clyde Perry (c); Parsons
 Helen Boyd Petrie (c); Manhattan
 T. R. Phan (c); Manhattan
 I. D. Phillips (c); Chicago, Ill.
 J. J. Pierce (e); Wheaton
 S. L. Potter (c); Westmoreland
 Katherine Poulton (c); Turon
 Faye Marie Powell (c); Iola
 Alice L. Paynter (c); Alton
 Grover C. Poole (e); Manhattan
 J. A. Pratt (c); Willis
 Elva Price (c); Baileyville
 A. V. Prince (c); Atchison
 Doris Prickett (c); Wamego
 Viola Price (c); Manhattan
 Gwendolyn Priest (c); Greenleaf
 Vern H. Purdy (c); Pittsburg
 G. J. Raleigh (c); Clyde
 Walter P. Raleigh (c); Clyde
 W. J. Reardon (e); Liberty
 Agnes Remick (c); Manhattan
 Marion Reed (c); Manhattan
 R. E. Reber (e); Robinson
 P. E. Reickert (e); St. Francis
 Glenn Reed (c); Galesburg
 Lloyd Ream (c); Turon
 T. A. Rhine (c); Cleburne
 Levi Ringwalt (e); Oakley
 A. D. Rice (e); Lamont, Okla.
 Mrs. Hugh Rinck (e); Mound Valley
 Benj. Ridlou (e); Buffalo
 G. O. Robinson (c); Ashland
 J. M. Roach (e); Lovemont
 Harlan B. Roberts (e); Vernon
 Frank B. Robb (c); Scott City
 C. W. Roberson (e); Bird City
 H. H. Robinson (c); Washington
 Dorothy Robertson (c); Midian
 Frank M. Robertson (e); Wichita
 Gladys Roderick (c); K. S. A. C.
 Mrs. O. E. Rogers (e); Cherokee
 Clifford Roesener (c); Manhattan
 Roland E. Roney (c); Scranton
 Louis P. Ruffle (c); Auburn
 Floyd A. Rucker (c); Junction City
 Mary Ryan (e); New Cambria
 Ralph Sangster (e); Protection
 L. K. Sam (e); Gooding, Idaho
 Geo. H. Sawallesh (c); Isabel
 Archie O. Saylor (c); Emporia
 Cceil W. Sargent (c); Riley
 Maria Schmidt (c); Goessel
 Pearl A. Schrick (c); Utica
 F. G. Schmuck (e); Warsaw, Ill.
 Hermine Schmidt (c); Goessel
 Anson Scott (e); Wichita
 Carl Seiwert (e); Andale
 Bessie Maye Segrist (c); Soldier
 Floyd Semisch (e); Keighley
 John Shellhaas (c); Junction City
 Robt. Shoffner (c); Kipp
 Harold S. Sherrard (e); Winfield
 Alverta Shellenbaum (c); Manhattan
 J. D. Shepherd (e); Osborne
 Gladys Shell (e); Deerfield
 Kate B. Shields (e); Iola
 Harold Shawhan (e); Hutchinson
 Warren R. Sheff (c); Haven
 Albert Siler (e); Fredonia
 W. E. Simpson (e); Bossier, La.
 W. T. Siebecker (e); Riley
 R. G. Silverthorn (c); Hardtner
 Paul L. Sites (c); Phillipsburg
 Leland Sinderson (c); Manhattan
 Edward Skidmore (e); Columbus
 Harry Edwin Skoag (c); Corbin
 L. W. Sitterman (e); Lenexa
 Owen G. Skinner (e); Marion
 Jno. Slickers (e); Orange City, Iowa
 Clara Smith (c); Mound City
 Sam. J. Smith (c); K. S. A. C.
 Chas. E. Smith (Mrs.) (e); Independence
 Arthur Smith (e); Burdett
 Lester Smith (c); Lenora
 R. D. Smith (e); Liberal
 Grace K. Smith (c); Le Roy
 Frank S. Smerchek (e); Garnett
 Mrs. C. A. Smith (c); Raymond
 Joy McFarlane Smith (c); Raymond
 Chas. H. Snyder (e); Glidden, Iowa
 Otis F. Snyder (c); Topeka
 Lloyd L. Spiker (e); Gunwald, Iowa
 Henry Springer (e); Stockdale
 N. S. Spangler (c); Abilene
 J. C. Sparks (e); Hill City
 W. J. Spencer (e); St. John
 John Stalder (e); Woodruff
 Anna Steele (e); Melvern
 Christine Stebbins (c); Columbus
 Bethel Stebbins (c); Junction City
 Stella Stackhouse (c); Homer, Ohio
 Florence Stafford (e); Mankato
 Nettie Startup (e); Topeka
 Earl Stilwell (e); Mitchell, Neb.
 Mrs. Ethel Storer (e); Alton
 Warren E. Stone (c); Manhattan
 Paul Strahl (e); Overland Park
 Robert Stultz (c); Manhattan
 Wm. D. Stukey (e); Des Moines, Iowa
 Floyd Sutton (c); Greeley
 Mary Sullivant (e); Junction City
 Levin A. Swenson (c); Little River
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